

**Final Technical Report:
NRSP Project R7957**

**‘Poverty Dimensions of Public Governance and Forest
Management in Ghana’**

Kojo Amanor, David Brown & Michael Richards

**With Maxwell Kude Diderutuah, Eric Sam-Quartey, Kwabena Opoku-Mensah
and Francis Hazel-Cobbina**

***Overseas Development Institute, London
&
Institute of African Studies, University of Ghana, Legon***

NATURAL RESOURCES SYSTEMS PROGRAMME

FINAL TECHNICAL REPORT

DFID Project Number

R7957

Project title

‘Poverty dimensions of public governance and forest management in Ghana’

Project Leaders

Dr. David Brown (UK)
&
Dr. Kojo Amanor (Ghana)

Organisation

Overseas Development Institute, London
&
Institute of African Studies, University of Ghana,
Legon.

NRSP Production System

Forest-Agriculture Interface

Date

June 2002

TABLE OF CONTENTS

	Page
List of Acronyms	1
1. EXECUTIVE SUMMARY	2
2. BACKGROUND	3
3. PROJECT PROPOSAL	6
4. OUTPUTS	7
4.1 Output 1	8
4.1.1 <i>Research study sites</i>	8
4.1.2 <i>The context of environmental decision-making in the Brong Ahafo</i>	12
4.1.3 <i>Agricultural policy and its effects on the Brong Ahafo Region</i>	15
4.1.4 <i>The small farmer in policy discourse</i>	17
4.1.5 <i>Fallowing and permanent cultivation</i>	17
4.1.6 <i>Population and land tenure</i>	18
4.1.7 <i>Population and land tenure</i>	20
4.1.8 <i>Main circuits for land acquisition</i>	21
4.1.9 <i>Migrants and chiefs</i>	23
4.1.10 <i>Natural resource tenure</i>	25
4.1.11 <i>Supplementary livelihoods</i>	25
4.1.12 <i>Cropping systems</i>	27
4.1.13 <i>Agricultural intensification</i>	31
4.1.14 <i>Farming strategies</i>	31
4.1.15 <i>Adaptive strategies of farmers</i>	33
4.1.16 <i>Fallow tree resources and agriculture</i>	34
4.1.17 <i>Farmer adaptation and innovation</i>	39
4.1.18 <i>Agricultural research</i>	40
4.1.19 <i>Poverty and agricultural development</i>	41
4.1.20 <i>Managing the environment under decentralisation</i>	46
4.1.21 <i>Structures of decentralised environmental policy</i>	46
4.1.22 <i>An interim assessment of environmental decision-making</i>	49
4.2 Output 2	51
4.2.1 <i>The way forward</i>	51
4.2.2 <i>Taking account of complexity</i>	52
4.2.3 <i>Engaging with decentralisation</i>	52
4.2.4 <i>Other interventions</i>	53
4.2.5 <i>Entry points for research</i>	57
4.2.6 <i>The role of information</i>	58
4.2.7 <i>The proposed project</i>	59
4.3 Output 3	63
4.3 Comparison between planned and actual outputs	65
5 RESEARCH ACTIVITIES	66
5.1 Research methodology	66
5.1.1 <i>Choice of study areas</i>	68
5.1.2 <i>Study sites</i>	69
5.1.3 <i>Charcoal as a case study of multiple land use conflicts</i>	69
5.1.4 <i>Assembly members survey</i>	70
5.1.5 <i>Land cover change sub-project</i>	70

5.1.6	<i>Other aspects of research management</i>	71
6	ENVIRONMENTAL ASSESSMENT	73
7	CONTRIBUTION OF OUTPUTS	75
8	PUBLICATIONS AND OTHER COMMUNICATION MATERIALS	78
9	REFERENCES CITED IN THE REPORT, SECTIONS 1-7	78
10	PROJECT LOGFRAME	78
11	KEYWORDS	82
12	ANNEXES	82

FIGURES

4.1	The Brong Ahafo Region	9
4.2	Fallow intervals	19
4.3	Tenure arrangements in the Brong Ahafo transition zone	23
4.4	Main crops grown in the Brong Ahafo transition zone	28
4.5	Project Logframe	79

TABLES

4.1	Characteristics of settlements, indicating main research themes	10
4.2	Fallow intervals in cropping systems	20
4.3	Sources of men's and women's land	24
4.4	Main off-farm incomes	26
4.5	Distribution of crops in men's and women's farm plots	29
4.6	Dominant cropping systems	32
4.7	Usage of inputs and mechanised technology on farm plots	35
4.8	Percentage of men and women using inorganic fertiliser	36
4.9	Investments in hired labour and tractor services	36
5.1	Profile of the survey area	72

BOXES

4.1	Uses and abuses of environment narratives – 1	14
-----	---	----

ANNEXES

ANNEX 1: A Brief History of Agriculture in the Transition Zone of Brong Ahafo

1.1	Phases of agricultural development	1
1.1.1	<i>Colonial agricultural policy</i>	2
1.1.2	<i>Agricultural modernisation, input subsidisation and market liberalisation</i>	2
1.1.3	<i>Market liberalisation and crisis of mechanised high input agriculture</i>	3
1.1.4	<i>Agricultural Research Infrastructure and agricultural information systems</i>	4
1.1.5	<i>Environmental policy and information systems</i>	5
1.2	Population and migrations in Brong Ahafo	6
1.2.1	<i>Land Tenure</i>	7
1.2.2	<i>Population and land tenure</i>	8
1.2.3	<i>Main circuits through which land is acquired</i>	8
1.2.4	<i>Migrants' Access to Land</i>	19
1.3	Natural resource tenure	19
1.4	Supplementary livelihoods	21

FIGURES

1.1	Tenure arrangements in the Brong Ahafo transition zone	10
1.2	Extent of cultivation	14

TABLES

1.1	Density of population by region in Ghana	6
1.2	Sources of men's and women's land	11
1.3	Main off-farm incomes	21

ANNEX 2: Cropping Systems

2.1	Cropping profiles in the districts	1
2.2	Farming strategies	8
2.3	Fallowing and permanent cultivation	9
2.4	Farmers' adaptive strategies	12
2.4.1	<i>Ecological adaptation</i>	12
2.4.2	<i>Impact of agricultural policy and infrastructure on farming practice</i>	12
2.5	Case studies	15
2.5.1	<i>Case study 1: Kokoago - Agricultural intensification through adaptation to agricultural infrastructure collapse</i>	15
2.5.2	<i>Case Study 2: Subinso - decline of agricultural input technology</i>	16
2.5.3	<i>Case study 3: Buoku - commercialisation without inputs in a changing environment</i>	17
2.5.4	<i>Case study 4: Bush fallowing and intensification in the yam belt</i>	19
2.6	Fallow tree resources and agriculture	22
2.7	Farmer adaptation, innovation, and the agricultural research system	25

Figures

2.1	Main crops grown in the Brong Ahafo transition zone	2
2.2	Fallow intervals	10

Tables

2.1	Distribution of crops in men's and women's farm plots	3
2.2	Crops cultivated by men and women	5
2.3	Percentage of monocropped and intercropped plots cultivated by men and women	7

2.4	Dominant cropping systems	7
2.5	Fallowing intervals on farm plots	10
2.6	Fallow intervals in cropping systems	11
2.7	Fallow intervals for yam plots at Weila, Mansie and Nsawkaw	11
2.8	Usage of inputs and mechanised technology on farm plots	13
2.9	Percentage of men and women using inorganic fertiliser	14
2.10	Investments in hired labour and tractor services	14
2.11	Tree varieties preserved on farm plots	23

ANNEX 3: MANAGING THE ENVIRONMENT

3.1	Introduction	1
3.2	Structures for Decentralised Environmental Policy	2
3.2.1	<i>Structures of decentralisation</i>	2
3.2.2	<i>The Forestry Service and natural resource management</i>	8
3.2.3	<i>The Fire Volunteers and natural resource management</i>	10
3.2.4	<i>Chiefs and natural resource management</i>	11
3.2.5	<i>District Chief Co-ordinating Executives and Natural Resource Management</i>	12
3.3	Charcoal Management Issues	15
3.3.1	<i>Social organisation of charcoal production</i>	15
3.3.2	<i>Case studies of charcoal production</i>	17
Appendix	<i>Local Government Reform in Ghana</i>	21
Tables		
3.1	Revenues of the Wenchi District Assembly for 2000	16
Figures		
3.1	Structure of the District Administration	5

ANNEX 4: THE WAY FORWARD

4.1	Changing Paradigms	1
4.1.1	<i>Institutional mechanisms</i>	3
4.2	Other interventions	3
4.3	Entry points for community action	7
4.4	The Proposed Programme	9
4.4.1	<i>Project Outputs</i>	11

Abbreviations and Acronyms

AgGDP	Agricultural gross domestic product
CFC	Community Forestry Committee
CIDA	Canadian International Development Agency
CPP	Convention Peoples' Party (Ghana political party)
CPR	Common pool resources
CDR	Committee for the defence of the revolution
DA	District Assembly
DANIDA	Danish International Development Agency
DCE	District Chief Executive (presently, a political appointee)
DCD	District Coordinating Director (formerly, District Chief Coordinating Executive [DCCE] – a Civil Service appointee)
DESC	District Environmental Sub-committee
DFID	Department for International Development (UK)
EPA	Environmental Protection Agency (Ghana)
FAI	Forest-agriculture interface
GFC	Ghana Forestry Commission (replacing the Forestry Department [FD])
GNRC	Ghana National Reconstruction Corps
GTZ	<i>Deutsche Gesellschaft für technische Zusammenarbeit</i> (German Agency for Technical Cooperation)
IAS	Institute of African Studies (University of Ghana, Legon).
IITA	International Institute for Tropical Agriculture
NABFC	National Anti-Bushfire Committee
NDC	National Democratic Congress (Ghana political party)
NGO	Non-governmental organisation
NPK	Nitrogen-Phosphorus-Potassium (ie. abbreviation for a fertiliser containing a mixture of these three)
NPP	New Patriotic Party (Ghana political party)
NRSP	Natural Resource Systems Programme (DFID)
NTFP	Non-timber forest product
ODI	Overseas Development Institute (London).
OVI	Objectively-verifiable indicators
PDC	Peoples' Defence Committee
PNDC	Provisional National Defence Committee (former military regime).
PRA	Participatory rural appraisal (cf. GTZ's 'Programme of Rural Action')

1. Executive Summary

This is a scoping study to develop a research project on innovative strategies for natural resource management at the FAI in Ghana. This research stands to make a significant contribution to the realisation of the FAI Purpose, through improved understanding of the social and economic influences which have led to existing policies, and the decision-making processes which need to be taken into account in advancing environmental policy. The focus is socio-political, not technological. The first two of the Purpose-level OVIs have been achieved; the third is being addressed at a level appropriate to a scoping study.

Local government decentralisation is widely anticipated to improve environmental management by bringing decision making closer to the resource users, but there is little evidence from the Ghana case that this is actually occurring. Here, the dominant process has been to give new life to the principles of cultural and technological modernisation which have guided policy formulation since Independence. This has been sustained in a number of ways. The quality of environmental information available to local decision-makers is poor, and this has allowed externally-generated narratives to dominate the policy process. Environmental discourse has been manipulated by certain groups to pursue their interests against those with competing claims over natural resources. In addition, external interventions often rest on questionable assumptions (for example, the search for technologies to increase returns to unit area where labour and capital, not land, are in fact the limiting factors), and these have reinforced the centrist approach. Consultative processes which appear exemplary in terms of their adherence to principles of multi-stakeholder participation have tended, in the event, to exacerbate this bias. Finally, the fact that, in significant areas, authority over the environment has been withheld from the local level disenfranchises the democratic fora, and encourages the pursuit of environmental interests through emblematic means.

What needs to be done to re-orient environmental decision making? Five priority areas of research enquiry are identified. These concern:

1. The types of information system required for District Assemblies to better understand the social and economic processes which lead to alternative livelihood strategies, including the pressures of different forms of production on fallow lands.
2. The innovative institutional arrangements which are arising within localities, which may provide a vehicle to manage conflicts over natural resources.

3. The ways in which multiple stakeholder platforms and networks for rural producers might be encouraged, so as to facilitate a process of innovation, and encourage rural communities to act as agents of policy reform.
4. The means by which district and national policy managers can learn from developments outside of the existing national policy framework, and incorporate these processes into decision making in ways that broaden the potential for policy intervention by local-level producers.
5. The institutional linkages that need to be forged to facilitate a learning process, build consensus and integrate environmental decision making into the policy process.

The Scoping Study report makes proposals for these issues to be addressed in the substantive phase of research. A draft logframe for the proposed project is included.

2. Background

This project aims to contribute to the NRSP FAI Programme Goal (of developing planning strategies to sustain the livelihoods of poor people at the FAI) by, firstly, investigating in depth the various livelihood strategies of rural resource users, and then scoping out new institutional strategies for environmental management under administrative decentralisation. This is in a situation of considerable cultural and agricultural complexity, and in a policy framework which is still in process of development.

The social complexity of the forest-agriculture interface is a rather neglected factor in natural resource management in Ghana. Though the historically high levels of population mobility and land transactions, linked to short-term labour migration and long-term migrant settlement, have been well documented nationally, they have not been given priority in most of the recent policy-oriented studies of land use at the forest-agriculture interface. For a number of reasons, this represents a significant gap in the applied literature.

Firstly, farming systems in the forest-savanna ecotone are often complex and subject to significant variation on ecological, social and economic grounds. The supporting vegetation patterns in which these cropping systems emerged have themselves developed over long historical periods, strongly influenced by anthropogenic forces. Many income sources are natural resource based, and bring their practitioners into conflict with other users of the same resources (charcoal being an important current example). The social context is a complex one, however, on

some occasions exacerbating divisions, on others encouraging cooperation. (This may occur, for example, where land is in relative surplus; those who control land may prefer to hire it out to temporary migrants, rather than to cede it to relatives on a long-term basis).

Secondly, this region has been much affected by successive government policies for agricultural modernisation, primarily through the development of large-scale mechanised state farms. Though the latter have generally failed, their influence is still felt in a number of ways. Where land was stumped to facilitate access by agricultural machinery, this has affected the cropping systems which it can subsequently support, their needs in terms of fertiliser application, and the labour required to exploit them. New road facilities have also increased market access, contributing to the emergence of one regional centre, Techiman, as the nation's major wholesale agricultural market. And the migrant labour which was initially brought in to clear the state farms, was subsequently released onto the local market, and this has biased farming systems and resource management arrangements in line with the increased labour availability.

Thirdly, the Government of Ghana has recently embarked on policies of local government administrative devolution and participatory forest management, which proceed from certain assumptions about the integrity of the rural community, but which are likely, in practice, to both reflect and influence its diversity and complexity.

Local government decentralisation, in its present manifestation, has its origins in the reforms first introduced in 1987 by the PNDC (military) regime, but since confirmed by successive civilian governments. While devolution is still far from complete, there is in process a progressive transfer of decision-making and legislative control to district-level authorities for many aspects of environmental management. The exceptions are those concerned with timber values (which remain under the control of the national Ghana Forestry Commission) and land allocation (which, in most areas, is the personal prerogative of the local chief, acting in the name of the traditional stool authorities). In an environment in which the strength and nature of claims over natural resources are heavily influenced by origins, ethnicity, age, gender, affinity and length of residence, this makes for the emergence of a complex arena of negotiation, in which competing parties with differential access to, and influence with, local legislators, seek to pursue their own interests in competition and cooperation with others. In so doing, they invoke various environmental and social principles. These in turn influence the subsequent evolution of institutions and policy.

Underpinning the study is a concern with the implications of decentralisation for the rural poor. A review of the literature suggests that the linkages between democratic decentralisation and poverty reduction are uncertain, at both national and local levels. With respect to the latter there is, indeed, some evidence of an inverse relationship. There are a number of possible reasons for this. For instance, poor people may be marginalised by the high opportunity costs to them of political participation. For decentralisation to succeed also requires high levels of accountability of both elected representatives and bureaucrats to the citizenry at large. Rural populations are often, to varying degrees, heterogeneous and hierarchical. Such social complexity may well be inimical to the success of decentralisation policies. Periodic elections are unlikely, on their own, to create the kinds of public accountability which are central to democratic functioning. Accountability mechanisms may also act to strengthen the position of elites, defined by various social and class criteria. Where these elites are in an antagonistic relationship to the rural majority, the effect will be to further marginalise the position of the poor. For decentralisation to contribute to a redistribution of wealth within a locality is likely to require high levels of social organisation and political awareness on the part of the poor. Where there is a requirement for poor groups to challenge powerful local elites, then a strong party organisation is likely to be required. Decentralisation systems which disfavour such political articulation between centre and periphery are unlikely to favour radicalism. At the same time, other factors (such as the strength of patronage systems) may also act to limit the potential for loyalties to develop around economic interests rather than social identities.

These observations are pertinent to the case of Ghana, where party affiliations are prohibited in elections at district level and below, elites tend to be in an antagonistic relationship to the small farming class and the poor suffer from divided ethnic and other loyalties.

On all these grounds, there is good reason to argue that livelihood strategies will be crucially influenced by social identities and institutions, and that these will, in their turn, be reflected in political processes. Natural resource use at the FAI thus has important implications for governance, in that the 'rules of the game' are being developed largely in the local contexts of resource use, and under conditions in which national and global interests interact with local ones, though not necessarily in a pro-poor way.

These considerations all pointed to the need for empirical research, firstly on livelihood systems and decision-making, and secondly, on how environmental policy is being formulated in a situation of decentralisation to local government. The ultimate aim was to help adapt policies and management models/practices to the emerging realities, while seeking to safeguard both the condition of natural resources in the FAI and the interests of the poor and vulnerable.

This proposal responded to a research topic identified in the NRSP FAI production system call. By its nature, socio-political research of this type is unlikely to result from direct demand from within the policy community, particularly on the part of the poor. Its value has to be judged by future benefits, rather than immediate demand.

3. Project Purpose

This was a scoping study whose purpose was defined by NRSP FAI LF Activity 1.2, viz *‘Strategies for promoting new management approaches to increase the livelihood opportunities of poor people developed and implemented in Ghana, in the FAI target zones’*

This was to be achieved through a phased approach involving:

- Initial scoping study (the present contract)
- Full research study
- Validation of recommendations (in association with national and bilateral partners)
- Wider dissemination.

The following indicators of progress were identified for the scoping study:

1. Knowledge of institutions mediating policy (decentralised local government/ agriculture and forest-related institutions) updated, identifying gaps and key constraints.
2. Research topics on strategies of participatory management aimed at enhancing the livelihoods of the poor and marginal at the FAI investigated and elaborated with a view to informing future FAI calls on Ghana and elsewhere.
3. Uptake pathways for alternative policy and other innovations defined and assessed.

4. Outputs

This study is of a research scoping nature, and has three outputs:

1. Increased understanding of the social and institutional dimensions of natural resource management at the FAI in Ghana
2. Potential alternative strategies for developing and delivering appropriate participatory management approaches to benefit the poor identified
3. Increased awareness among NR researchers, policy-makers and development agencies of the types of changes which will be needed to ensure that current decentralisation and natural resource management policies contribute to poverty alleviation.

These outputs are reviewed in turn in this section of the report. It draws on the findings presented in the ff. annexes, to which the reader is referred for the detail of the argument, and the supporting data and references.

Annex 1: 'A brief history of agriculture in the transition zone of Brong Ahafo'

Annex 2: 'Cropping Systems'

Annex 3: 'Managing the Environment'

Annex 4: 'The Way Forward'

Annex 5 presents the draft logframe for the proposed follow-up project.

4.2 Output 1: *'Increased understanding of the social and institutional dimensions of natural resource management at the FAI in Ghana'*

Research results, with reference to Output One, consist of a more comprehensive understanding of the development of agriculture in the Brong Ahafo, the dominant cropping patterns, and the main environmental and institutional issues in natural resource management.

A complex picture emerges. This belies many of the assumptions that underpin current research, and challenges several of its principles.

Following the review, a forward research strategy is identified and discussed.

4.1.1 *Research study sites*

Farming systems in the transition zone are diverse. In order to comprehend this diversity, six settlements in three main administrative areas were selected for research. These were:

1. Wenchi District – the Ahenfie electoral area in the Nsawkaw Area Council, comprising part of Nsawkaw, Tanoso and Njau; also Subinso, Atuna, and Buoku electoral areas;
2. Kintampo District – Weila and Mansie
3. Techiman District – Kokoago

These settlements covered the main ecological areas of the transition zone. Their location in relation to the main forest ecotones is indicated in Map 1. In addition, a study of the functioning of the district assembly and its component unit committees was undertaken in one district, Wenchi. Figure 4.1 indicates the sites of the main settlements studied, and Table 4.1 summarises their major characteristics:

Figure 4.1 The Brong Ahafo Region

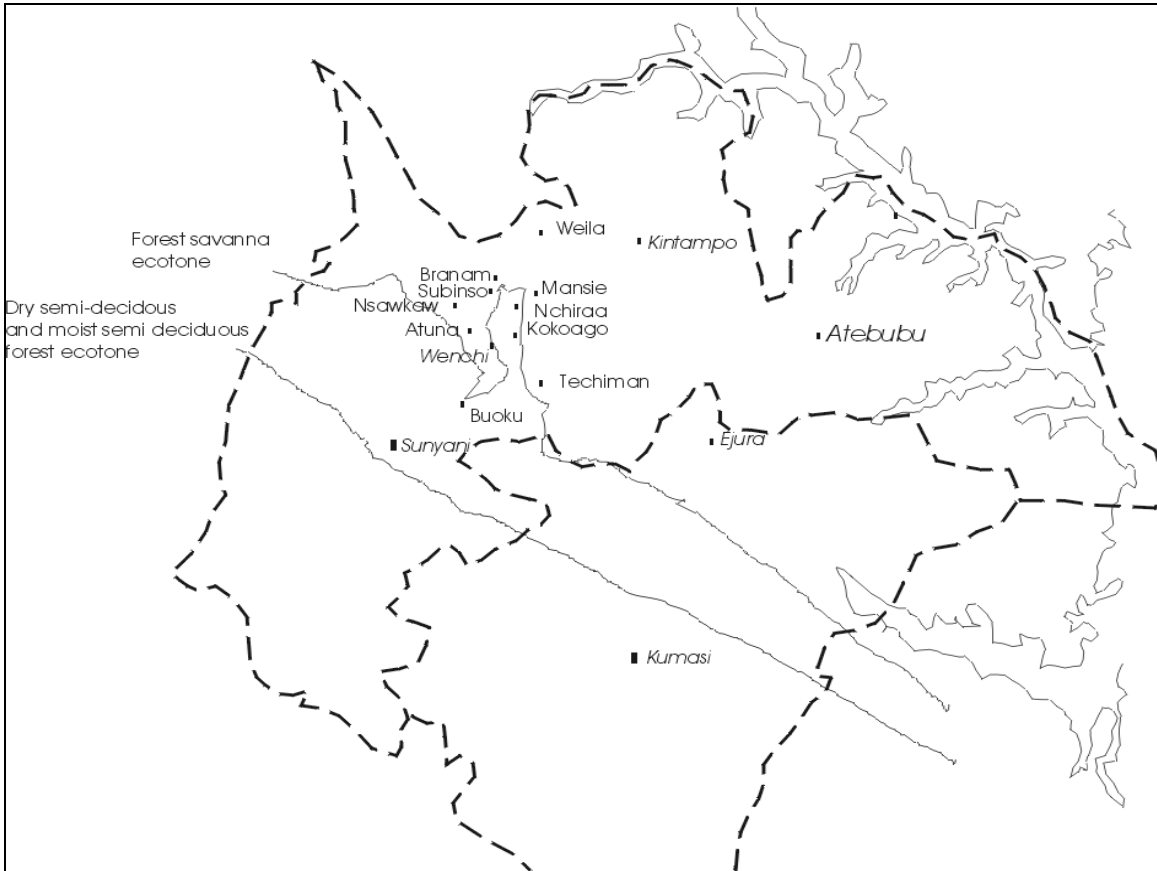


Table 4.1: Characteristics of Settlements, indicating main research themes

<i>Settlement</i>	<i>Ecological zone</i>	<i>Dominant Ethnic Group</i> (note: migrants of various origins – mostly from the Upper West – found in all settlements)	<i>Main research interests</i>
1. Subinso	Savanna-forest mosaic	Brong and Deg (Mo) landowners, with many migrants, mostly from the Upper West.	<ol style="list-style-type: none"> 1. Former centre of agricultural modernisation; lands extensively cleared & stumped; soils now exhausted. 2. Farmers moving into cassava and groundnuts; crop diversification.
2. Atuna	Savanna-forest mosaic	Dagaaba migrants from Upper West Region	<ol style="list-style-type: none"> 1. Fuelwood and charcoal as secondary income sources for migrant women. 2. These recently banned by chief (ref. party political conflict)
3. Buoku	Semi-deciduous forest fringe	Migrants from Dormaa – as cocoa farmers; Migrants from Upper West (originally cocoa labourers); Some indigenes from Wenchi	<ol style="list-style-type: none"> 1. Settled by Dormaa migrants for cocoa in 1920s. 2. The only settlement with evidence of major land constraint. 3. Only settlement with sharecropping. 4. Also taungya, encroachment on forest reserve 5. Family lands mainly farmed by women.
4. Weila	Savanna-forest mosaic.	Nafana (Banda) immigrants (from colonial times), in Deg (Mo) area	<ol style="list-style-type: none"> 1. Well within the parkland (yam) zone, and thus dependent on environment rich in small trees/coppices for staking. 2. Land still in significant surplus.

			<ol style="list-style-type: none"> 3. Recent disputes over charcoal production, involving conflict between local youths and Sissala charcoal burners (now migrated elsewhere). 4. Crops: Yam and maize production. Conflicts between environmental management and livelihoods rights (yam/charcoal)
5. Mansie	Savanna-forest mosaic	Deg (Mo)	Ditto (per Weila)
6. Kokoago	Forest-savanna mosaic	Short distance migrants mainly from near Techiman, originally settled to farm cocoa.	<ol style="list-style-type: none"> 1. Ex-cocoa lands, adjacent to defunct irrigation project and close to Wenchi State Farms, and more recent (now collapsed) GNRC mechanised farm. Local farmers have since moved onto stumped lands for maize cultivation. 2. Mechanized maize cultivation practiced by some farmers, with chemical inputs. 3. Local systems for intensive tomato cultivation. 4. Division of lands between men (grassland areas) and women (forest lands).

4.1.2 *The context of environmental decision-making in the Brong Ahafo*

The present study took as one of its preliminary objectives, the characterisation of the narratives which guide environmental decision-making in the Brong Ahafo region, particularly among the key decision makers at District Assembly and Unit Committee levels, and in the public support agencies.

Among the striking features of these narratives are their simplicity, uniformity, and largely external origins. Perceptions of environmental change within the region over the last two decades have become intertwined with received wisdom about small farmer practices (most of it of colonial origins) to give rise to a set of ‘crisis narratives’. These accord well with recent international discourse about environmental decline in Africa. They stress such themes as:

- The destructiveness and non-sustainability of traditional agriculture, particularly swidden practices (‘slash and burn’).
- The destructive effects of bush fires; the alleged anthropogenic origins of the devastating bushfires which swept through Ghana and the West African sub-region in 1983, and the resulting need for major changes in small farmer practices.
- The impending crisis in agriculture which is being caused by rampant population growth, resulting in environmental problems (shortening fallows and land degradation) and food security decline, both of which imply the need for a rapid transformation in traditional agriculture, through intensification of land use.¹

There is little to suggest that such crisis narratives have any substantive connection with the realities of farming in the Brong-Ahafo. They are not, indeed, evidence-based to any appreciable extent. Rather they are rooted in external perceptions and interests, and are sustained by a number of features of the local political environment. These include, most notably:

- The paucity of sources of information for environmental decision-making;
- The external dependence, both intellectually and in terms of resources, of the central extension services;
- The social complexity of the small farmer population, and the fact that conflicts over natural resources tend to be overlaid with important social dimensions;

1. Throughout this report, ‘intensification’ is used in the conventional sense, to refer to increases in the quantity of other factors, as compared to a relatively fixed area of land (see, for example, Ellis, 1988: 196).

- The local interests which can be served by mobilising such narratives within the legal and administrative frameworks provided by local government decentralisation, in pursuit of partisan interests.

Examples of the use of such narratives, in the form of situational analyses, are provided in Box 4.1. Additional evidence is given in Annex 3.3.2.

Box 4.1 Uses and abuses of environmental narratives – 1

Case Study One: Weila

Weila is a settlement in the northern parkland zone, inhabited mainly by Banda peoples who settled in this Mo area in historical times. This is a yam producing area. Land is in surplus and there is no shortage of small trees and coppices for staking out the growing yams.

A few years ago, a group of Sisala migrants came to the area, and were allocated charcoal-production rights for sale by the chief. This involved an annual payment to allow them access to specified areas to cut living trees for conversion into charcoal for sale in the urban areas (about 90 percent of urban dwellers in Ghana are estimated to use charcoal for their fuelwood need). The species in question (predominantly *Anogeissus leiocarpa*, *Terminalia glaucescens*, *Pterocarpus erinaceus* and *Lophira lanceolata*) were not ones of agricultural interest.

The chief's prerogative was much resented by the local youths. Acting on a policy initiative of Kintampo District Assembly, they forced through a bye-law to prevent the cutting of live trees to make charcoal, and to restrict charcoal production only to the transformation of dead wood. They cited the extreme destructiveness of the migrants' production methods as justification for their decision. Whether or not it was valid in these terms, it had differential effects on indigenes (ie. Mo and Banda) and migrants (Sisalas). Yam farmers have ready access to dead wood on their farms, while the migrants, as specialist charcoal producers, do not. Having learnt charcoal production methods by watching the migrants, the indigenes were now in a position to exploit this as a complementary income-generating activity. The Sisalas found it difficult to gain access to charcoal resources since they now had to compete with local youth and farmers who gained preferential access over migrants from their relatives. As a result of the difficulties they experienced in gaining access to charcoal resources, the increasing expense and social tensions, the Sisala charcoal-burners moved on to other areas where no live wood ban had been applied.

One of the effects of this case has been to increase the level of conflict between the chiefs/elders and the youths. The former were reluctant to control the charcoal burners as this brought them valuable revenues. The chief, who feels somewhat outwitted by the youths, is now trying to introduce controls over indigenes burning charcoal.

Case Study Two: Mansie

At Mansie a similar pattern obtains further down the line. The charcoal burners have gone, charcoal has become the main income of the youth, and the unit committee and chief are attempting to control and ban exploitation of charcoal by indigenes, though with little success. Many farmers, whose main interests are yam are concerned about the effect of increasing charcoal exploitation on yam farming. The main debates on these issues take the form of environment versus livelihood rights.

Two case studies – conclusion

Interesting questions arise, therefore, concerning the process of policy formulation and the scientific basis for it; the net effects on agricultural production and the environment, and on the livelihoods of the various groups involved. In neither case was there any evidence that policy making was evidence-based, except in the most impressionistic terms. Non-partisan environmental information is not available at these levels, and neither short-term nor long-term decision-making is premised upon it.

Arguably, the consequences of the new opportunities opened up by political decentralisation have been less concerned with the promotion of environmental standards than the pursuit of partisan interests. The evidence is that a 'grand narrative' has been commandeered by a particular group to promote its own interests – only to be subsequently manipulated by others to support their counter-claims.

The first purpose of this report is to survey natural resource use in the Brong Ahafo Region, and to characterise the actual bases of decision-making by small farmers, the ways in which they have adapted to changes in their environment, and the variations in experience between them.

4.1.3 Agricultural policy and its effects on the Brong Ahafo Region

Agriculture in the Brong Ahafo has a long history, dating back at least to the second millennium BC. The patterns of cultivation which have developed bear witness to the interplay between natural and managed environments, and confound a common perception of an essentially static traditional agriculture.

Over the centuries, there have been considerable shifts in climate and vegetation within the transition and forest zones, marked by retreats and advances of species associated with forest and savanna, as periods of desiccation alternated with relative humidity. By managing a wide array of crop species and micro-environments, farmers have developed techniques of risk and environmental management which secure their long term returns to labour.

A series of policy developments in the post-colonial period has had a profound influence on the character of agriculture in the Brong Ahafo. The main of these have been:

- Starting in the early 1960s, agricultural modernisation through the development of large-scale mechanised farming; this led to large-scale land clearance and tree stumping, tractorisation, and associated infrastructure development (particularly road building).
- Adoption, in the 1980s, of structural adjustment policies involving market liberalisation, and the removal of input subsidies, leading to the collapse of mechanised agriculture in most areas.

Though the state farms and associated enterprises failed, they have nevertheless had significant effects upon the rural economy. These effects have included:

- Increased demand for agricultural services and inputs;
- New opportunities for the business class to acquire large areas of land;
- Changes in soil structure and vegetation types (consequent on stumping and ploughing), creating a new dependence on inputs;
- Improved infrastructure (particularly roads);

- Increased availability of migrant labour, attracted to the region initially by work opportunities in the modern sector, as well as the opening up of communications and wholesale food markets.

This influx of migrants changed the balance between the factors of production, and opened up new possibilities to increase productivity through heavy investments of labour. Two investment patterns thus established themselves in the Brong Ahafo in the 1970s, '80s and '90s:

- Intensification through investment in mechanisation and subsidised inputs;
- Increased production through investment in hired labour, more extensive land clearance, and more intensive weeding.

The former was most pronounced close to the state farms, where support services were concentrated, the latter in more distant areas. With the removal of input subsidies, the demand for hired labour increased, as the high cost of inputs was compensated by switching to more labour-intensive systems.

With few exceptions, formal agricultural research has functioned to support these major policy developments, and has been conceived within their premises. Research has been predominantly structured by an approach in which growing land pressure is seen as the critical determinant of agricultural change, demanding the search for new technologies (variously mechanical, chemical and organic in their origins) to permit intensification. Even today, the systems research projects in the Brong Ahafo rest largely on the presumption that land shortage demands the development, as a matter of urgency, of technologies to increase returns to unit area.

Such assumptions largely ignore the more important trends in the Brong Ahafo, particularly the implications of the commodification of labour and the emergence of large labour markets in the agricultural sector. As will be discussed in the next section:

- Land remains in relative surplus in most areas
- The responses of farmers to pressures for agricultural change have been conditioned more by the availability of labour than shortages of land.

Thus:

- Where population densities are low, the available labour has been applied to increase the area under extensive cultivation;

- Where densities are higher, the additional labour has been applied to more intensive use of land (though not necessarily as a response to land shortage *per se*).

In neither case has viable agriculture developed in line with predictions.

4.1.4 The Small Farmer in Policy Discourse

One of the consequences of this failure has been an inability to develop the capacity to challenge the dominant environmental narratives. Thus, presumptions as to the cultural backwardness of the small farmer community continue to dominate the arenas of national policy making, and block a more creative engagement with a dynamic economy.

While the problems of ‘modern agriculture’ in Ghana should have promoted a more critical approach, recent environmental rhetoric has acted in a contrary direction, and the policies of cultural modernisation have only been reinforced. These environmental policies have, moreover, imbued the dominant narrative with an added moral dimension which has had the effects of both criminalizing established farming practices (such as bush burning), and elevating donor-friendly alternatives (for example, teak and cashew production) onto a morally superior environmental plane. Ironically, extensive tree plantations may well end up mirroring the land hoarding strategies of the mechanisation era, to the detriment of the small farmer majority. Like stumping and ploughing, tree plantations tend to be seen as a strategy to alienate land and secure it for the long term.

4.1.5 Fallowing and Permanent Cultivation.

Much of the rhetoric on agricultural modernisation contends that population growth creates pressures on fallowing systems because of its effects on land quality. Rising population pressure leads to shortened fallows, and this in turn leads to short cycles which prevent soils recycling sufficiently. This creates a downward spiral of impoverished soils with insufficient resting periods before cultivation.

Data collected for this study presents a more complex picture. Medium fallows of between 3-6 years prevail in the Brong Ahafo transition area, with 31 percent of farmers using longer fallows of over 7 years and 10 percent fallowing for over 10 years. While there is evidence of farmers responding to land shortage in certain areas by using shorter fallows (as at Buoku where 37 percent of plots are being fallowed for periods of between 1-2 years), adoption of intensive

farming methods and inputs at Kokoago has led to equally high rates of short fallows. Low land pressures are not necessarily associated with long fallows (for example, at Kokoago 39 percent of farmers use short fallows of 1-2 years and at Subinso 23 percent of farmers used 1-2 year fallows). In the settlements in the parkland zone where yam farming is of prime importance, short fallows are rare (only 5 percent of Nsawkaw , 10 percent of Weila and 14 percent of Mansie farm plots were previously fallowed for short periods of 1-2 years).

There also seems to be some evidence of matching crops to land and to fallow intervals on the land. This is reflected in the high percentages of monocrop cassava grown with short fallows and the high percentages of yam (usually intercropped with cassava) grown with medium-long fallows (see Figure 4.2 and Table 4.2). However, there is no direct correlation between cropping and fallow systems, since many farmers have sufficient land to allow for fallows of at least 3-6 years.

Factors other than soil restoration are also important in decisions as to length of fallows, including build up of pests and weeds in the soil. This is a critical influence on yam production methods, for example.

4.1.6 Population and Land Tenure

Land tenure regimes in the Brong Ahafo are conditioned by its comparatively low population densities. Two distinct regimes are evident, corresponding to the variable ecology:

1. *Family lands system:* In the high forest areas, considerable labour needs to be invested in land clearance. Once land has been cleared, there are pressures to maintain it, and a family land system is likely to develop. 'Intensification' of this type is not necessarily the result of land shortage as such, but rather reflects the impact of labour constraints on farmer decision making.
2. *Bush fallow system:* Woodland areas are not so difficult to clear of their woody biomass, though grasses can be problematic. The thinner organic matter of the parkland soils needs to be tilled and organic matter built up. Labour intensive mounding techniques have been developed. Such areas are prone to dry season bush fires, however, and under these conditions, a store of invested labour cannot be easily maintained within the cleared fallows. The major labour inputs are not in transforming woody vegetation, but in tilling the savanna soils. Farmers move freely from area to area within the lands where their settlement claims rights of ownership, clearing the most suitable regenerated land for their yam farms.

In recent years, new factors have come into play and these have resulted in a growing incidence of individual and family land.

- As land pressure builds up, with the influx of migrant farmers and migrant labourers, this leads to a consolidation of holdings under family tenure. While land is still in relative surplus, individuals tend to intensify on well-placed plots, in order to avoid having to travel far from the settlement to gain good land.
- Mechanised tilling requires heavy investment in preparation, and thus also increases interest in existing farm plots.
- Investment in woody perennials, such as cashew and teak, creates a two-fold interest in sedenterisation of farm holdings; most obviously, in terms of the plantation itself, but also because,

Figure 4.2 Fallow intervals

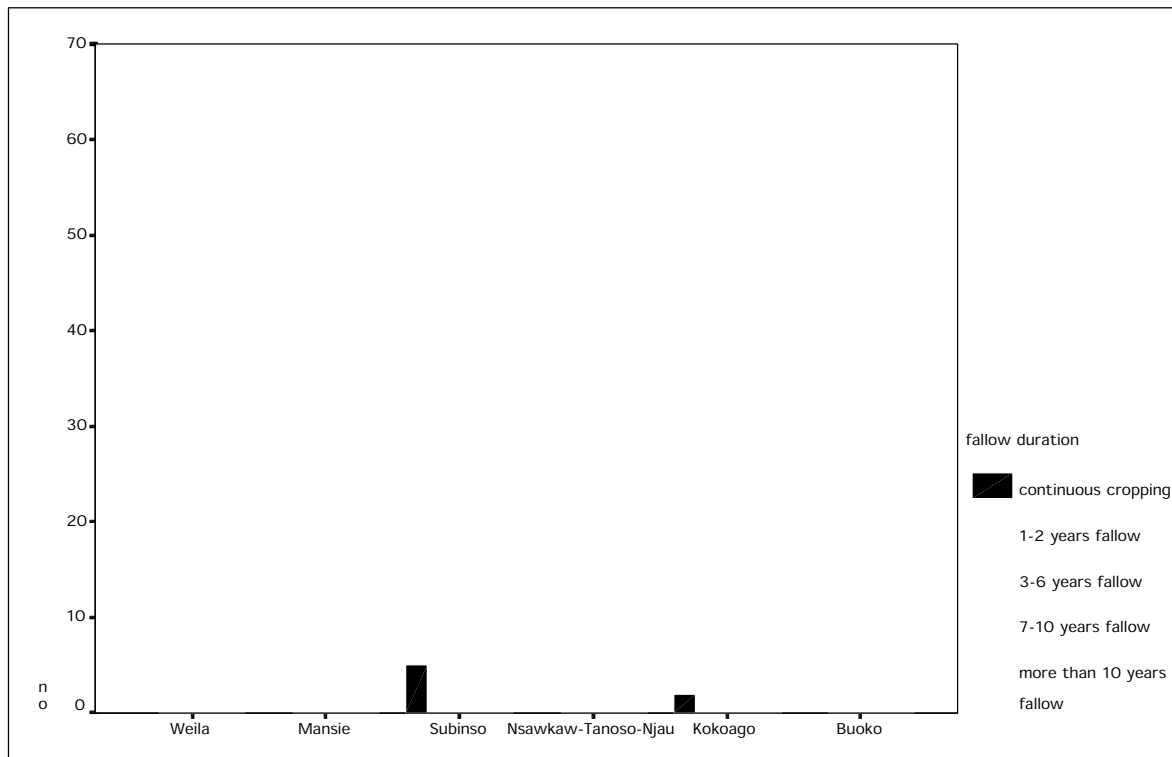


Table 4.2 Fallow intervals in cropping systems**Percentage of plots under different fallowing intervals in different cropping systems**

Cropping system	Continuous Cropping	1-2 years fallow	3-6 years fallow	7-10 years fallow	over 10 years fallow	No. of farm Plots
Yam-cassava	1	12	36	36	15	113
Yam-maize	.	13	67	13	7	15
Yam-cassava-maize (%)	.	8	58	29	.	24
Maize-cassava	2	22	46	22	9	46
Sole maize	3	29	47	10	11	62
Sole groundnut	.	26	44	18	13	39
Cassava-groundnut	.	29	49	15	7	41
Sole cassava	.	42	42	12	4	26

by taking land out of the fallow system, it diminishes the available area and increases pressures to secure rights to farm land. Paradoxically, therefore, it is the introduction of new technologies which have created pressures for change in the tenure system in the Brong Ahafo, not the incompatibility of increasing population densities with traditional swidden systems.

4.1.7 Population and land tenure

The low population densities of the Brong Ahafo are reflected in the land tenure systems. Only 2% of plots (n.816) were cultivated under share cropping arrangements. Sharecropping is concentrated in the semi-deciduous forest settlement of Buoku, where 11% of all farm plots are farmed in this way.

Land hiring and leasing are generally relatively rare; only 6% of farmers lease land, though this spreads across all ecological zones.

4.1.8 Main circuits for land acquisition

These include:

- *Family land* - land on which families claim rights through constant cultivation, including the right to pass land on by inheritance.
- *Rights of spouses* - usually due to women working on land made available by their husbands, on marriage.
- *Clearance rights over community land* - individual rights claimed through 'first clearance'; these may be converted into family land over time.
- *User rights* - rights temporarily ceded to another farmer for use, and acknowledged through some sort of token payment.
- *Rights given by chiefs* - usually to migrants, without existing rights; some prestation has to be made to the chief, as well as an annual payment, probably in cash and kind.
- *Hiring of land* – leasing of land for monetary rents; this becomes more attractive as land becomes scarcer - rights given by chiefs may well gradually be converted into leaseholds in such situations; the land may be hired for one year or more, depending on the cropping cycle;
- *Sharecropping* – also emerges with increasing scarcity of land, and is more common than leasing in the semi-deciduous forest areas; sharecropping arrangements in the Brong Ahafo are mostly of the *abunu* and *abusa* type (respectively, the landlord retaining a half or third of the production), possibly in the same farm or even (as applied to different crops) field.
- *Squatting* – is found on state farms and forest reserves.

The dominant forms of land access in the study areas are evident from Figure 4.3 and Table 4.3.

From these it will be seen that:

- a) About 50% of farmers gain access to land through family ties.
- b) In the northern transition zone, farmers can also gain access to uncultivated community/stool land (20% have access to community land; see particularly Weila and Mansie).
- c) Clearing uncultivated bush is also fairly common in Nsawkaw, less so in Subinso, though this may reflect the high proportion of migrants in the latter settlement.
- d) Women often gain access to land through spouses or affines.
- e) 14% of women in the sample gained land through their spouses or affines, though there is significant local variation in this, with the highest proportions in the land abundant northern settlements.
- f) Women's dependence on their spouses is primarily a reflection of access to labour; women in the northern areas, lack access to sufficient labour for land clearance, and are forced to make

do with the abandoned yam farms of their husbands; this in turn leads them to plant crops which do well under such conditions, such as groundnuts. In secondary growth areas of the dry semi-deciduous forests, the labour constraint is less in evidence, and women find it easier to gain access to adequate labour for clearing, or alternately to do it themselves; forest soils respond well to minimum tillage, and thus are less demanding in terms of labour than parkland areas where mounds and ridges have to be made.

- g) In situations of growing land scarcity but increasing commercial opportunities, young ambitious men may seek access to land through hiring, sharecropping and other non-family circuits. This is to avoid family obligations, and also to gain access to the best land available. With competition for hiring of prime lands, women have to make do with the less fertile small family plots. This may result in more individually based farming strategies among men.
- h) Partly as a result of (f) above, men tend to farm larger acreages than women (more than double the average area, though with considerable local variation).
- i) User rights are more common in the parkland environment, and frequently reflect relations between a migrant and an indigene. For example, in Subinso, 86% of those who gain access to land in this way are migrants; at Nsawkaw, the figure is 64%. This is particularly likely to occur where increasing scarcity of land encourages land owners to protect their own long-term rights through ensuring that surplus land is kept in cultivation by others. Migrants are often preferred in such situations, as their rights are only temporary.
- j) As land becomes scarce, leasing tends to become more attractive to migrants; 17% of all migrants in the sample gained access to land through leasing, while none of the indigenes did so. Leasing is particularly likely to occur in settlements such as Kokoago (maize) and Subinso (maize, groundnuts), with a developed commercial sector.
- k) Hiring is particularly likely on already stumped land, where landlords can charge a premium for labour already invested in land 'improvement'.
- l) Land in areas such as Kokoago is frequently hired for long periods (eg. 3 years), to gain maximum returns from labour invested through intensive rotations (maize/tomatoes/cowpea).
- m) Where land is in short supply, as in some high value forest locations, sharecropping displaces monetary rents and user rights. As in the case of Buoku, this is the preserve of migrants (12% of all plots are sharecropped, though never by indigenes).
- n) Where land is becoming in seriously short supply - again as in Buoku - this tends to be reflected in the large number of farmers gaining access through taungya arrangements, or illegal encroachment into the forest reserve; there are, however, additional political factors in this case.

With the increasing commodification of agriculture and the influx of immigrants, all this may change. What were previously subsistence crops may become cash crops. As relative prices change, men may shift more into groundnut production, and thus displace their wives from last year's yam fields. Where migrant labour is abundant, the opportunities for women farmers may increase.

Vagaries in climate may have similar effects, perhaps breaking down the traditional division of labour, and encouraging crop diversification by men and/or women.

4.1.9 Migrants and Chiefs

The relatively low population density of the Brong Ahafo Region (particularly in the more northerly parklands), and the high labour costs which farming involves in such areas, result in relatively low rental values for land, and relatively easy access. The movement of migrant labour into this zone has been a prime factor in opening it up, and allowing local farmers to expand into commercial food crop cultivation.

Figure 4.3 Tenure arrangements in the Brong Ahafo transition zone

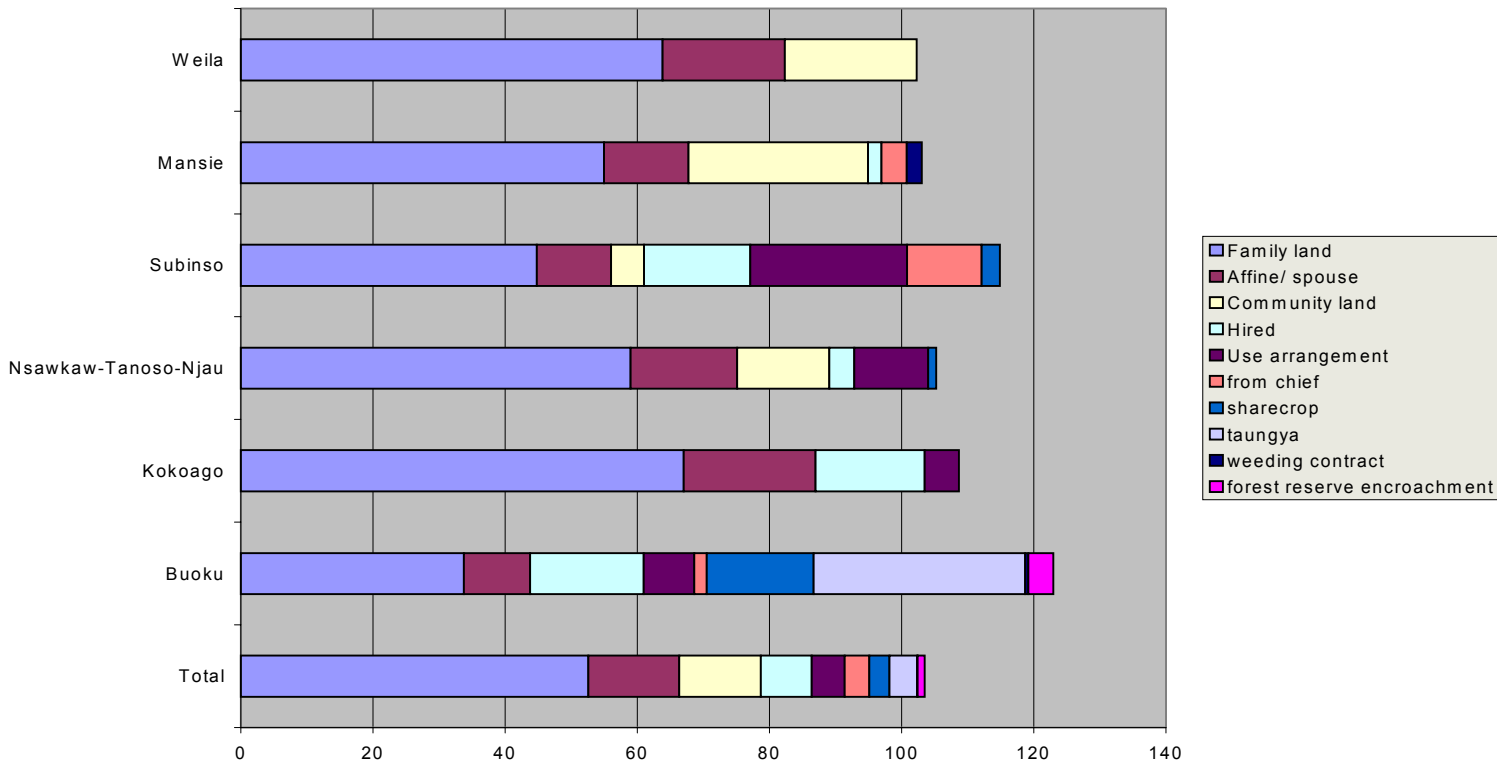


Table 4.3 Sources of men's and women's land

	<i>Settlement</i>						Total
	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoku	
Male							
Family	71.4%	44.4%	42.2%	51.2%	52.9%	15.4%	46.2%
Community clearance rights	28.6%	48.1%	6.7%	16.3%			16.7%
Spouse or in-laws			2.2%	4.7%	5.9%	7.7%	3.2%
Use			13.3%	11.6%		3.8%	6.5%
From chief			13.3%			3.8%	3.8%
Hiring			6.7%	4.7%	23.5%	15.4%	7.0%
Sharecropping			2.2%			7.7%	1.6%
Taungya						11.5%	1.6%
forest reserve encroachment						3.8%	.5%
Family & use			4.4%		5.9%		1.6%
Family & hiring				2.3%	5.9%		1.1%
hire & use			8.9%				2.2%
Use & sharecrop						3.8%	.5%
Weeding contract		3.7%					.5%
Community and family		3.7%		4.7%			1.6%
Government agency and family land				2.3%	5.9%		1.1%
Family and purchased ²				2.3%			.5%
Family and taungya						15.4%	2.2%
Taungya & sharecropping						7.7%	1.1%
Community and hire						3.8%	.5%
Women							
Family	50.0%	61.5%	31.4%	52.6%	58.3%	32.0%	46.9%
Community clearance rights	4.5%		2.9%	5.3%			2.8%
Spouse or in-laws	40.9%	26.9%	20.0%	24.6%	33.3%	12.0%	24.9%
Use			14.3%	10.5%			6.2%
from chief gift		7.7%	8.6%				2.8%
Hiring		3.8%	5.7%	1.8%		12.0%	4.0%
Sharecropping			2.9%	1.8%		8.0%	2.3%
Taungya						20.0%	2.8%
forest reserve encroachment						4.0%	.6%
Family & use			2.9%			4.0%	1.1%
Family & hiring			5.7%				1.1%
Hire & use			2.9%				.6%
in-laws & hire			2.9%				.6%
Community and family	4.5%			3.5%			1.7%
Family and in-laws					8.3%		.6%
use & taungya						4.0%	.6%
Taungya & sharecropping						4.0%	.6%

²The purchased land is a building plot purchased in town, subsequently used for farming

In many instances, the relationship has served the migrants well. However, the extensive (and large unchecked) ‘traditional rights’ of the chiefs do allow them to impose a relationship of clientage on their migrants, which can lead to some resentment.

4.1.10 *Natural Resource Tenure*

The 1962 Concessions Act vested all trees in Ghana in the Office of the President, to administer on behalf of the ‘allodial authority’ (the chiefs). This gives the Ghana Forestry Service control over all trees (particularly timber trees) whether in forest reserves or on farmers’ fields. In the latter case, farmers have no right to any royalty payments, although royalties are paid to the chief, the stool and to the district authority.

While in the past, the timber industry was interested only in redwoods and the like, with export potential, increasing scarcity of timber trees and diversification of exports has increased its interest in what were hitherto unconsidered species. A formal ban on chainsaw production has further shifted access to timber away from farmers to the industry.

For these and other reasons, production for local livelihoods has increasingly focused on charcoal, using species without potential as timber. As will be later discussed, this has brought small producers into increasing conflict with chiefs and district authorities (to whom charcoal represents a potentially lucrative source of income), as well as the environmental lobby, for whom charcoal is a major emblem of environmental degradation, even ‘desertification’.

4.1.11 *Supplementary livelihoods*

Around 46% of all men and 56% of women have supplementary off-farm incomes. In the case of men, these include natural-resource based (e.g. charcoal) and artisanal (e.g. tailoring) activities, and petty trading. For women the main income sources are petty trading (e.g. dressmaking), preparation of cooked foods, and (in the case of Dagaaba migrants), brewing of *pito* (sorghum beer). Table 4.4 gives a breakdown of off-farm income sources.

Charcoal production is the only developed source of natural-resource based off-farm income for men, although in some areas, it is largely produced by specialist (non-farming) Sisala migrants. This lack of developed crafts based on natural resource utilisation is at odds with a common

perception as to villagers' high dependence on the natural environment for off-farm income.³ It reflects a hostile policy

Table 4.4 Main off-farm incomes

Percentage of farmers engaged in off-farm activities	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoku	Total
Men							
Off-farm incomes	43	50	51	48	39	46	46
Natural resource exploitation	18	43	11	10	6	4	15
Charcoal	11	39	4	5	.	.	9
Hunting	3.5	4	.	.	.	4	1.5
Herbalist	.	.	2	5	.	.	1.5
Carpenter	.	.	.	.	3	.	0.5
Pestle-carving	.	.	2	.	.	.	0.5
Mortar-carving	3.5	.	.	.	.	.	0.5
Hoe-handle making	.	.	2	.	.	.	0.5
Palm-wine tapping	.	.	.	.	0.3	.	0.5
Petty-trading	11	4	9	5	10	12	8
Artisan	10	.	20	16	16	.	11
Casual labourer	.	,	,	7	.	.	1.5
Women							
Off-farm incomes	54	57	80	40	59	56	56
Natural resource exploitation	.	12	3	2	.	.	3
Charcoal	.	12	3	2	.	.	3
Petty trading	41	19	37	19	32	32	31
Prepared food	14	15	23	7	23	8	14
Pito brewing	.	4	11	2	.	8	4

³ This may seem at odds with the findings of Wiggins *et al* (2001). However, direct comparisons are difficult to make, both because of the different bases of the assessments (individuals vs. employment rankings/days worked + income said to be obtained), and differences in the location of the settlements studied.

environment. The framework of natural resource tenure largely excludes villagers from ownership rights; the legislative system criminalizes their use of tree resources; and environmental policies are prone to equate off-farm natural resource based incomes and 'environmental degradation'. This is in marked contrast to the importance of forest resources in national exports, and underlines the marginalisation of the interests of the small farmer majority.

4.1.12 Cropping Systems

Cropping systems in the transition zone of Brong Ahafo are complex and diverse. In the survey of 6 different settlements and 818 farm plots, over 150 different cropping combinations were found. The dominant crops cultivated were: yam, cassava, maize groundnut, sorghum, plantain, cocoyam, bambara beans, cowpea, tomato, okro, pepper, and garden egg. Small quantities of rice are cultivated in valley bottoms. The dominant tree crop cultivated is cashew with some farmers also investing in teak plantations.

The main crops (indicating % farmers cultivating, and % farm plots, in each case) are:

- Cassava – in both major ecosystems (76/45)
- Yam – mainly in the parkland zone (71/36)
- Maize – both zones (60/35)
- Groundnut – mainly parkland, though increasingly in the semi-deciduous forest fringes also (48/24)

Groundnut is mainly a women's crop (70% women, cf. 29% men). Yam, cassava and maize are more likely to be men's crops.

Intercropping is more common than monocropping in the transition zone (62% cf. 38%). This is indicative of risk management strategies, primarily in relation to rainfall and pest attack.

Monocropping is dominant only in the Kokoago area, indicating the strong commercial orientation of farmers in this area. Monocropping tends to be associated with high input use, as is commonly the case with maize, though there are many exceptions (for example, groundnut monocropping is not associated with use of inputs).

The main crops are as indicated in Figure 4.4. Table 4.5 gives the distribution of crops in male and female plots, and Table 4.6, the dominant cropping systems.

Figure 4.4 Main crops grown in the Brong Ahafo transition zone

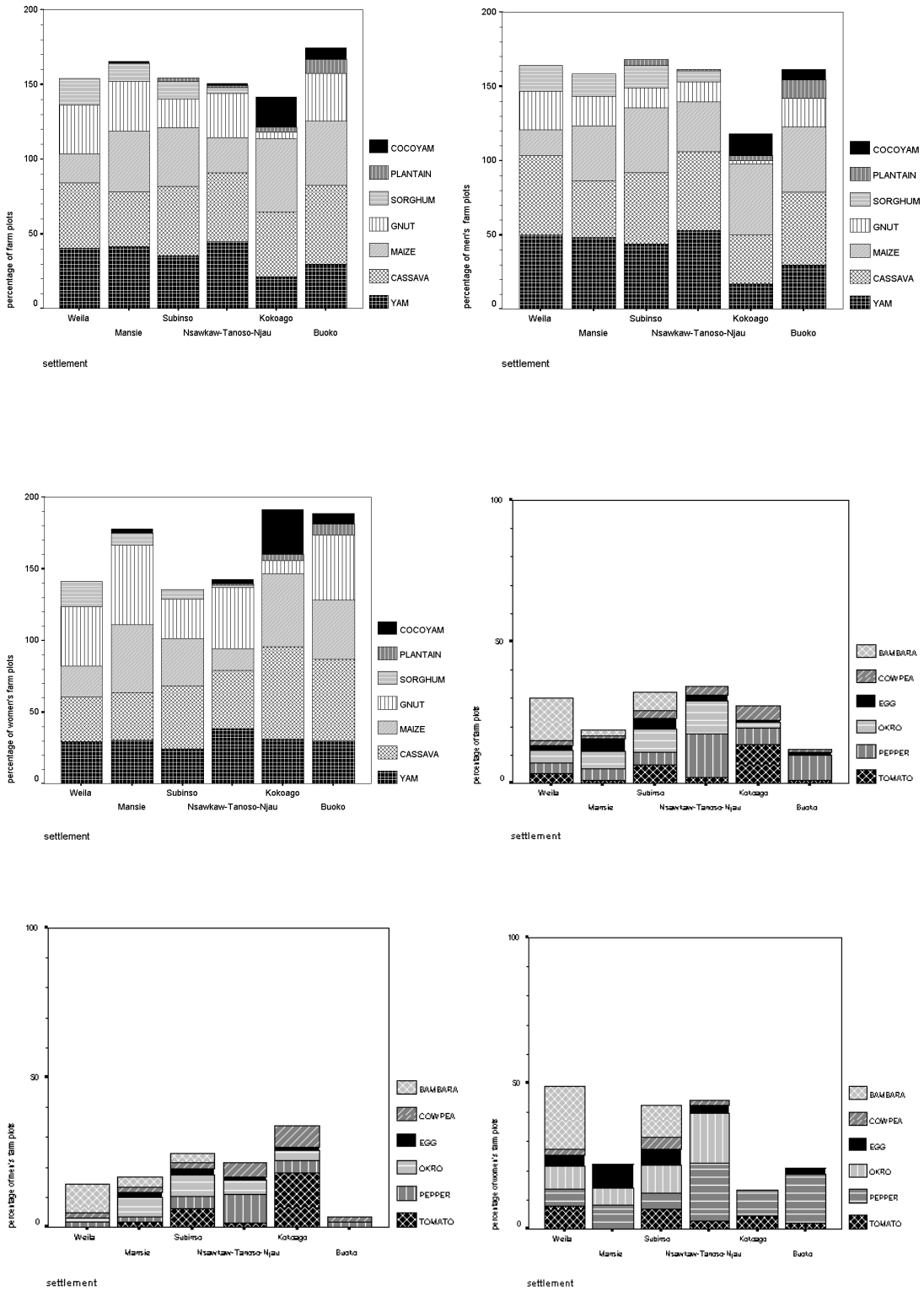


Table 4. 5 Distribution of crops in men's and women's farm plots

Crop	Sex of Cultivator of plots	Percentage of plots under different crops						
		Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	Total
Yam	Male	50	48	44	53	17	30	40
	Female	29	31	25	39	31	30	32
	All	41	42	36	45	22	30	36
Cassava	Male	53	38	48	53	33	49	45
	Female	31	33	44	41	66	57	44
	All	43	36	46	46	43	53	45
Maize	Male	18	37	44	34	48	44	38
	Female	22	47	33	15	51	41	31
	All	19	41	39	23	49	43	35
Groundnut	Male	26	20	13	13	2	19	14
	Female	41	56	27	42	9	45	37
	All	33	33	19	30	4	32	24
Sorghum	Male	18	15	15	7	0	0	9
	Female	18	8	7	2	0	0	5
	All	18	12	12	4	0	0	7
Rice	Male	0	0	1	4	0	0	1
	Female	0	0	0	8	0	0	3
	All	0	0	1	6	0	0	2
Bambara beans	Male	10	3	3	0	0	0	2
	Female	22	0	11	0	0	0	5
	All	15	2	6	0	0	0	4
Cowpea	Male	2	2	2	5	7	2	3
	Female	2	0	4	2	0	0	2
	all	2	1	3	3	5	1	3
Plantain	Male	0	0	4	1	3	12	3
	Female	0	0	0	1	4	8	2
	all	0	0	2	1	4	10	3
Cocoyam	Male	0	0	0	0	15	7	4

	Female	0	3	0	3	31	8	6
	All	0	1	0	2	20	7	5
Tomato	Male	0	2	6	1	19	0	6
	Female	8	0	7	3	4	2	4
Crop	Sex of Cultivator of plots	Percentage of plots under different crops						
		Weila	Mansie	Subinso	Nsawkaw- Tanoso-Njau	Kokoago	Buoko	Total
	All	3	1	6	2	14	1	5
Garden egg	Male	0	2	2	1	1	0	1
	Female	4	8	6	3	0	2	3
	All	2	4	3	2	1	1	2
Okro	Male	2	7	7	5	3	0	4
	Female	8	6	10	17	0	0	9
	All	4	6	8	11	2	0	6
Pepper	Male	2	2	4	10	4	2	4
	Female	6	8	6	20	9	7	12
	All	4	4	5	5	6	9	8
Cashew	Male	6	5	12	24	2	2	9
	Female	2	6	1	20	0	0	7
	all	4	5	8	22	1	1	8
Teak	Male	0	2	1	0	0	7	1
	Female	0	0	0	0	1	0	1
	all	0	1	1	1	0	5	1
no of men's farm plots		62	60	98	83	94	57	454
no of women's farms plots		51	36	73	106	45	53	364
Total no of farms plots		113	96	171	181	139	110	818

4.1.13 *Agricultural intensification*

Increased agricultural production can be achieved in a number of ways, including:

- Investment in high input agriculture on extensive land areas;
- Investment in high input agriculture in small areas of land in which the aim is to maximise the impact of limited investments in inputs;
- Extensive cultivation through investments in hired labour for clearing and weeding, expanding areas of land;
- Intensive cultivation using hired labour and intercropping which aims to maximise returns to labour in a small area;

Given the abundance of land, its low cost and the relative high price of inputs and labour, farmer strategies focus on maximising returns to investments in inputs and labour rather than land-economising technologies.

4.1.14 *Farming Strategies*

Within the Brong Ahafo transition zone five styles/underlying strategies of farming can be found, which reflect different degrees of intensification or commercialisation of agriculture and different ways to maintain or increase levels of production. These are:

- Extensive cultivation using land tilling and mounding technologies within a distinct bush fallowing system in which land is rested for three or more years. Yam is frequently the most important crop in this system, but is usually intercropped with a variety of other crops. Farmers are concerned with tree regeneration, and look for well-regenerated areas in which to make new farms.
- Extensive cultivation of monocrops such as maize or groundnuts, or a narrow range of intercrops, such as maize-cassava and groundnut-cassava, within shorter fallowing regimes. Farmers are less concerned with the regeneration of the tree cover, but manage soils without application of inorganic fertilisers.
- Extensive cultivation of monocrops (usually maize) using inorganic fertiliser on land which has been stumped and ploughed. Cultivation is on a permanent basis.
- Intensive cultivation on smaller land areas of vegetable crops using inorganic fertiliser. These frequently involve complex cropping sequences alternating minor season and major season cultivation, extending periods of cultivation and minimising fallows.
- Intensive cultivation of smaller areas, with complex multiple cropping sequences, which focus on risk management and matching crops to soils. These usually occur in areas which

were originally cultivated with inorganic fertilisers on lands which have been stumped and ploughed, and in which the soils are often exhausted.

These various styles of farming compete and interact with each other, transform the soil and environment, impact upon each other defining the space that each can occupy, and define the possible niche in the totality of cropping systems. While policies may attempt to favour one farming style, other farming styles may be able to effectively mobilise resources to challenge the agricultural systems which are officially supported by government and international policy prescriptions.

Table 4.6 Dominant cropping systems

Percentage of plots under cropping system	<i>Settlement</i>						Total
	Weila	Mansie	Subinso	Nsawkaw-Tanosonjau	Kokoago	Buoko	
yam-cassava	28.3	13.5	14.0	30.2	8.6	11.8	18.5
sole maize	2.7	16.7	11.1	7.9	20.9	14.5	12.0
maize-cassava	1.8	1.0	7.6	6.9	20.1	9.1	8.2
Groundnut	14.2	10.4	8.2	8.5	1.4	3.6	7.6
cassava-groundnut	3.5	6.3	3.5	6.9	2.2	20.0	6.6
other groundnut intercrops	14.2	13.5	7.0	9.0	.7	3.6	7.7
yam-cassava-maize	1.8	10.4	8.8		3.6	3.6	4.4
sole cassava	.9	2.1	8.8	.5	7.2	5.5	4.3
sole yam	4.4	5.2	3.5	2.6	4.3	5.5	4.0
No. of farm plots	113	96	171	189	139	110	818

The dominant crops vary from area to area in relation to such factors as:

- Ecology
- Agricultural infrastructure
- The market niches that farmers have learned to exploit
- Changing policy incentives and disincentives.

Agricultural infrastructure, market niche and policy incentives are closely interrelated, since infrastructure development is often the result of policy directives, and policy may create new market opportunities or distort existing market options. New developments within the regional

economy may also have unforeseen consequences on policy. (An example of this is the way the development of a modern agricultural infrastructure also encouraged migrations of networks of farmers and labourers into the region in the post-independence period. This in turn opened up new avenues of agricultural intensification based on hired labour, which had not existed before the creation of an infrastructure based on modern inputs, and new forms of commercial market production which did not exist before the creation of state farms and extension services.)

4.1.15 Adaptive strategies of farmers

Over the years, farmers have adapted their farming systems in response to a number of factors. For example:

Ecological adaptation

Ecological adaptations include the matching of crops to specific micro-environments. Variations occur both by species and variety. With ecological modifications brought about by climatic changes and soil transformation under ploughing, different crops are modifying their ranges (a case in point being groundnuts, cultivation of which is extending southwards into grassy environments within dominant forest mosaics, as well as into degraded soils and soils impoverished by ploughing).

Impact of agricultural policy and infrastructure on farming practices

The development of a modern state agricultural sector and of a supporting agricultural infrastructure have had an important effect upon the farming systems in Brong Ahafo in both northern parkland and southern high forest fringe communities. However, such modern agricultural infrastructure has had variable, but often limited, impact on farming systems. Proximity to former state farms and other lands transformed by ploughing is influential, though these developments are not typical of high forest fringe area, where most farmers use no fertilisers and hire manual labour rather than invest in labour saving technologies such as tractor ploughs.

Table 4.7 shows the extent of usage of inputs and modern agricultural technologies on the various farm plots cultivated by farmers in the various settlements in the survey. Table 4.8 shows the proportion of farmers that use some fertiliser on any of their farm plots and table 4.9 shows the proportion of farmers who hire tractor services in the context of investments in hired labour. Large numbers of farmers throughout the survey area invest in hiring labour for weeding and

clearing, but outside of two settlements (Subinso and Kokoago), few farmers make investments in high input technologies.

Annex 2 presents detailed case studies of the four main study areas.

4.1.16 Fallow tree resources and agriculture

In the environmental policy literature in Ghana, the Brong Ahafo region is frequently portrayed as a zone prone to desertification, in which savanna is advancing and forest retreating, largely as a result of human intervention and farming practices.

This literature makes no attempt to differentiate between the diverse environments within Brong Ahafo, and the different tree resources found there. Two basic types of tree formations exist in the area, each with its distinct tree species:

a) dry semi-deciduous forest

Dominates in the south of the transition zone, and also occurs in riverine areas as gallery forests and on the sites of old settlements. Mosaics of savanna grassland and parkland also exist in this zone, which may reflect relicts of earlier transformations of the environment, or which may relate to edaphic features. Tree species are often larger, taller, less numerous, more vulnerable to fire and other stresses and less able to regenerate from coppice and root shoots than those in savanna woodland.

b) savanna woodland

This is characteristic of the more northerly areas. Tree cover is interspersed with grasslands dominated by *Andropogon* spp. Gallery forests with typical semi-deciduous pioneer species occur in riverine areas. Tree species tend to be smaller, more numerous, robust, and drought-resistant, to be fire resistant and able to regenerate from coppice regrowth, root shoots and suckers.

In both areas, trees are valued by farmers in bush fallowing systems as playing important roles on-farm and farmers preserve some tree varieties on their farms (the preferred species are reviewed in Annex 2.6 of this report).

Table 4.7 Usage of inputs and mechanised technology on farm plots

High input usage	<i>Settlement</i>						<i>Total</i>
	Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	
<i>Percentage of farm plots cultivated with inorganic fertiliser:</i>							
Male plots	.	1.8	5.1	2.4	8.7	.	7.8
Female plots	2	.	9.6	.	8.9	.	3.3
All plots	0.9	1.1	7.0	1.0	3.3	0	5.8
<i>Percentage of stumped farm plots:</i>							
Men's plots	.	1.7	21.9	1.2	22.3	1.8	10.0
Women's plots	5.9	2.8	27.4	10.4	8.9		10.7
All plots	2.7	2.1	24.3	6.3	18.0	.9	10.3
<i>Percentage of farm plots cleared with tractor:</i>							
Men's plots	.	.	11.2	1.2	9.6	8.9	5.8
Women's plots	.	.	23.3	.9	2.2	.	5.2
All plots	.	.	16.4	1.1	7.2	4.6	5.5
No of male farm plots	62	55	98	83	94	57	449
No of female plots	51	36	73	106	45	53	364
No of farm plots	113	91	171	189	139	110	813

Table 4.8 Percentage of men and women using inorganic fertiliser

Percentage of farmers using inorganic fertilizer	<i>Settlement</i>						
	Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	<i>Total</i>
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Men	.	4	11	5	58	.	13
Women	.	.	11	.	18	.	3
All	.	2	11	2	41	.	9
no of men	28	28	45	44	31	26	202
no of women	22	26	35	57	22	25	187
Total respondents	50	54	80	101	53	51	389

Table 4.9 Investments in hired labour and tractor services

Sex of farmer	Hired labour and tractor services?	<i>Settlement</i>						
		Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	<i>Total</i>
		(%)	(%)	(%)	(%)	(%)	(%)	(%)
Male	Hired labour for clearing	64	57	40	57	64	58	58
	Hired tractor services	.	.	18	2	11	.	6
	Hired labour for weeding	68	46	53	55	88	69	60
Female	Hired labour for clearing	77	81	71	71	58	92	76
	Hired tractor services	.	.	26	2	8	.	6
	Hired labour for weeding	64	62	68	51	68	76	62
All	Hired labour for clearing	70	69	46	65	55	75	63
	Hired tractor services	.	.	22	2	10	0	6
	Hired labour for weeding	66	54	60	53	79	72	61
No. of men		28	28	45	44	31	26	202
No. of women		22	26	35	57	22	25	187
Total respondents		50	54	80	101	53	51	389

In the more northerly yam farming belts, tree resources are important for staking yams and yam farms are made in areas with large densities of small trees. However, to cultivate yams under the trees, the latter have to be induced to shed their leaf cover to enable the yam tendrils to gain adequate access to sunlight. This is achieved by making fires under the trees, by ringing their bark, or by lopping the branches. The trees often recover and put out new shoots. These unusual patterns of tree use give agriculture a distinctive character in the relevant areas, and have important implications both on-farm (for cultivation) and off-farm (for charcoal production).

In the semi-deciduous forest zone, the most commonly preserved trees tend to be pioneer species, which are often the most robust and fastest growing. While there are many important timber resources in this forest, farmers do not have rights to these trees or to royalties from their exploitation.

Interestingly, farmers within parkland environments tend to preserve more trees on-farm than in the semi-deciduous forest zone. This is not surprising given that parkland trees are usually smaller than high forest trees, and regenerate easier from coppice regrowth. Farmers in the forest fringe area reported more problems coping with changes in tree cover, particularly as regards tree regeneration, than those in the parkland, particularly after the 1983 bush fires. The new scenario in the forest fringes includes annual bush fires which destroy forest trees and prevent their regeneration, expansion of grassland and areas dominated by the weed *Chromolaena odorata* ('Acheampong'), and increasing fuelwood shortage.

However, the picture is complex. For example, Buoku has a mixed forest and savanna aspect, with a high proportion of Borassus Palm (*Borassus aethiopum*). Informants at Buoku contend that the savanna grassland areas have existed as long as living memory, although they have expanded in recent times. In the past, forest and savanna coexisted in this area, although many of the timber trees were felled by concessionaires, mostly in the 1980s. Some savanna species – including Borassus palm – have expanded in area, due to the increasing incidence of bush fires, and have now become the dominant species in formerly forested areas. The occurrence of Borassus in the forest zone suggests that environmental change in the area has a long history.

Environmental change would appear to have been less in the parkland than semi-deciduous forest areas. When it comes to the nature of environmental change, farming populations in the parkland areas tend to be divided into two camps:

- One camp supports the doomsday narrative (serious decline, increasing population leading to over-cultivation, destruction of trees and imminent desertification);
- The other camp articulates a counter narrative, arguing that there may actually be more trees now than in the past (though perhaps of smaller girth), that the tree species are well adapted to fire, and that there is no fire crisis.

Within charcoal producing areas in the northern transition zone, debates about environmental degradation have become highly politicised, since there are complex struggles over the control of charcoal between competing resource users. These struggles are articulated and justified in terms of the destruction of the environment and of forests that result from charcoal production.

Charcoal production, and the conflicts which surround it, are considered in detail in the case study of 'Charcoal Management Issues' presented in Annex 3.3. This case study illustrates the ways in which resource conflicts are channelled into the decentralised political process. This in turn gives new life to the 'grand narratives' of environmental destruction - though it does not necessarily result in improved environmental management.⁴

Different farming systems also have different impacts on the regeneration of trees on fallow and farmland. For example:

- Yam farming depends upon the regeneration of trees for yam staking, and a process of promoting cutting, pruning and fire control and regeneration.
- High-input mechanised agriculture removes all the tree cover through stumping and attempts to maintain permanent cultivated plots that are free from trees to allow tractor ploughing.
- The expansion of maize cultivation within the semi-deciduous forest may also promote removal of tree cover.

At Kokoago, grasslands and stumped lands are considered prime lands for cultivation. This has gender implications. Women cannot afford investments in labour for maize production on grassland, and therefore have to farm the remaining secondary forest patches. This contrasts with the situation frequently found elsewhere in tropical Africa, where forest soils are retained by the men for their own use, and women are forced to farm on what are often less productive savanna soils.

⁴ This coincides with the findings of Wiggins *et al* who note that environmental rules which are accepted in principle are often freely broken when they conflict with economic imperatives (2001: 67).

4.1.17 Farmer adaptation and innovation

Farming systems within the Brong Ahafo region are complex, dynamic and diverse. Underlying this complexity is the ability of farmers to adapt to new conditions which result from changes in the biophysical, market, and policy environments. While self-provisioning is still important for most farmers, all the farming systems investigated have cash crop sectors which focus on producing for a defined market niche in which the farmers in question have comparative advantage. These niches change with time. Thus:

- ❑ In the past, the presence in certain areas of state farms and other government agricultural projects led to the availability of cheap, subsidised inputs and government support services. This encouraged farmers to go for high input permanent production on stumped and cleared land. It was the low cost of inputs and services, not pressures of land, which led to the breakdown of bush fallowing in these areas.
- ❑ Elsewhere, with insecure access to inputs, farmers began to develop alternative modes of investing in agricultural intensification other than through state controlled inputs. The significant amounts of available migrant labour were used to expand the areas under crop production and to intensify weeding regimes. The expansion of yam cultivation in the parkland areas was brought about in this way.
- ❑ The crisis in high-input agriculture resulting from the implementation of Structural Adjustment policies led to a shift in food production to low-input areas, where productive soils are still available.
- ❑ In some of the maize-producing areas, a combination of discontinued input use, unproductive soils, unreliable climate and changes in relative market prices has led farmers to switch to other crops such as cassava and groundnuts. Risk is also mitigated by mixed cropping of a variety of crops able to respond to different conditions.
- ❑ In yet other maize-producing areas, farmers continue with this crop (though with reduced inputs), while diversifying into other intensive sectors, such as vegetables which offer higher returns.
- ❑ Yam remains the most important crop in the northern parklands, within a bush fallowing system; varietal selection may be matched to land availability (with less heavy feeders gaining prominence when fallows shorten), as well as climate, market demand and taste. Yam farming is also being intensified through mixed cropping, particularly rotations of yam with cassava followed by groundnut, or (as a risk mitigation strategy) sorghum and bambara beans.

- The ecotone between semi-deciduous forest and forest-savanna mosaics has seen considerable transformation of cropping systems in recent years, particularly since the 1983 bush fire. Cocoa (dominant in the 1960s) has since been replaced by maize and vegetables; maize is, however, also characteristic of the savanna mosaics which have long existed in the same area.

The processes resulting in the historical formation of the savanna mosaics and the present transformation of moist semi-deciduous forest into grassland-dominated areas are uncertain. It is not clear to what extent farming systems have altered the environment, and the extent to which a drier climate phase or even global climate change has impacted on the forest ecotone. More information is required on the similarities and differences in farming practices between former forest settlements in which cocoa was cultivated and which have now been transformed into maize, cassava and vegetable cropping areas, and the maize cropping areas in the savanna mosaic areas. Little is known either about the dynamics and long-term sustainability of maize cultivation within these two areas.

Farming systems in Brong Ahafo are also competitive, seeking to establish a production niche in which they have a comparative advantage (or less of a disadvantage) on the market. The need to stay competitive has been intensified by structural adjustment, removal of subsidies and competition with cheap imports of food crops. All this has led to erosion of prices. The incomes of urban people have also been depressed as a result of devaluation, unemployment, etc., and this has intensified the purchasing power constraint. When they fail to establish a comparative advantage, farmers respond by experimenting with new crops and shifting to new farming strategies.

4.1.18 Agricultural research

Surprisingly little research exists on the different niches that farmers occupy and the factors that define the boundaries between different farming systems. These factors tend to be overlooked by mainstream agricultural research when it lumps together different farming systems in all-embracing categories, juxtaposing 'traditional agriculture' with 'agricultural modernisation'. Localised farming systems need to be understood in their relationship to regional systems and the ways in which they accommodate or adapt to features of agricultural modernisation.

Systems perspectives have dominated agricultural research, with population growth seen as the main motor for change. Such perspectives tend to regard bush fallowing as an outmoded system which needs to be replaced by more environmentally friendly technologies, such as:

- ❑ More intensive cultivation using inputs to limit the area under agricultural cultivation, to allow higher yields to be produced in smaller land areas, and enable larger areas to be preserved as forests, woodlands, and recreational areas;
- ❑ Use of green manures to promote better soil recycling, improved fallowing, shorter fallowing or permanent cultivation to enable more intensive and sustainable crop production in limited areas and allow for preservation of forest and woodland areas;
- ❑ Promotion of agroforestry systems to promote soil conservation, improved recycling of land and permanent cultivation in hedgerows systems such as alley cropping to enable more intensive and sustainable cropping from limited areas, preservation of trees and allow for preservation of more forests and woodlands.

The justification for the new technologies is often located in grand narratives of environmental crisis, requiring new interventions and new technologies. These narratives tend to encourage narrow commodity-focused programmes with only a limited acknowledgement of the wider setting.

Since research does not focus on the internal dynamics of farming systems, it tends to present the findings of commodity programmes as the solution to complex problems, with insufficient acknowledgement of their social-economic and political dimensions.

Little funding is available to support independent critical research. Such research as does occur tends to be conceived within the dominant paradigm. Thus, the major demonstration trials and government service recommendations concern crops in which research services have developed a comparative advantage. However, these do not necessarily coincide with crops grown by farmers nor support their dominant strategies. Two illustrative cases – *Mucuna* trials and the root and tuber programme – are reviewed in Annex 2.7.

4.1.19 Poverty and agricultural development

Since the early 1980s complex adaptations and responses to policy processes have occurred in farming systems in Brong Ahafo. These are partly in response to neo-liberal economic policies. Prior to the adoption of structural adjustment agricultural services were concerned with input

delivery services and the provision of subsidised modern inputs to farmers including chemical fertilisers and mechanisation services. These services were skewed, focused on particular geographical areas and concentrated on larger farmers who often built up a relationship of clientship with government and agricultural services and rural banks dispensing soft loans. During the 1970s large mechanised farms appeared that focussed on food production. These commercial farmers often acquired large tracts of land that were stumped and put under permanent cultivation. With the removal of subsidies many of these large farms have collapsed, since the high price of inputs and of credit (bank interests rates have been around 30-40 percent in the 1990s to present times) are not reflected in farmgate food prices.

Commercial farmers have tended to move out of food production into export crops. In Brong Ahafo the main export crop that has been developed is cashew. The main constraints to cultivating cashew are the cost of the seedlings, the cost of labour to create the plantation, knowledge about cultivation techniques and markets, the cost of pesticides and access to pesticides, and ability to gain sufficient land for large-scale cultivation. Cashew is a crop for middle and prospering farmers. Timber (mainly teak) plantations are another area in which large farmers are interested, since it secures land for the owner, minimises labour in the long term after the initial investment in clearing the plantation, and promises good returns. Major problems for investment in plantation are the risk of fire and the problems of discounting capital on a long-term investment. The commitment of the government to a timber plantation development project with loans for farmers and outgrower type relations with timber companies may make timber plantations more attractive to large farmers in the future. However, small farmers may have insufficient land available to participate in plantation schemes. This may lead to more rural poverty as land becomes increasingly scarce as large farmers expand areas of production in response to government incentives and loans, which small farmers are unable to access.

During the 1970s and 1980s there was some trickle of modern technologies in the vicinity of government agricultural projects, such as state farms. These farmers ploughed their land with tractors, invested in fertilisers since they were cheap. This was mainly used for maize cultivation. However, ploughing frequently destroyed the topsoils and farmers had to continue using fertilisers to produce adequate yields of maize. With free market prices for fertilisers these farmers found the price increase in fertilisers was not realised in the price for their crop, but that they could not get good yields of maize on their land without the use of fertilisers. In these areas there is frequently a decline in agricultural production, in which agriculture may be abandoned

and youth migrate in search of alternative livelihood opportunities. The size of food crop farms decline, groundnuts and cassava replace maize, and farmers develop risk minimising strategies on smaller areas of land. Maize production is taken up in other areas with better soils where bush fallowing is the dominant mode of farming. In these areas farmers find rising prices for maize an incentive to move into maize production and they can now produce maize more competitively than those areas formerly using inputs, which they displace. Thus the price of maize on the domestic market does not take into account the cost of inputs since sufficient maize can be produced without inputs.

However, introduction of maize into new areas also leads to problems for the poor. Richer farmers can invest in labour to clear and weed their farms and easily expand the area under cultivation leading to land scarcity for some. Frequently increased commercialisation of agriculture has a gender dimension. Within the Mo areas of the northern transition zone where yam is the major crop the traditional division of labour involved men clearing new plots of land from fallow and planting these under yam. Women helped in the weeding. When the yams were harvested women took over the plots and planted groundnuts. In contemporary times, this division of labour is breaking down. Instead of abandoning the old yam farm to their wives many men are now planting maize on them. Men have also intensified production by introducing multiple cropping in which they plant cassava in the yam mounds and continue cropping into a second year. Many men have also gone into groundnut cultivation since it has a good market price. Some men now divide their old farm into two portions allocating half to their wife (or wives) and retaining a half for their own use.

In other areas with variable farm ecologies, the main commercial crops are produced in particular niches, which are monopolised by the richer men. This may include areas near water sources for vegetable production, more fertile land, or areas that have formerly been stumped by state enterprises and projects, which are used for maize production, as at Kokoago. In some areas, the more fertile lands for commercial crop production are hired out. Poorer people farm on small areas of family land which may have a long history of cultivation and be less fertile, while those requiring large plots for commercial production hire the land. Land hiring in these areas ensures that the best land is retained for those with capital to invest in it. Those with capital also frequently prefer to hire land for commercial crop production rather than use family land, to avoid a drain on their capital from the social demands of their extended families. For instance, at Buoku, large maize farms are usually made on hired or sharecropped land, while those using

family land tend to grow intercrops of a variety of food crops of which groundnuts is perhaps the most important crop and the others are largely grown for self-provisioning. Groundnuts are important since they can be grown on small areas of land with short fallowing systems. Here, the most significant category of family land-users are women, who lack the capital to make heavy investments in agriculture.

The increasing commodification of agriculture adversely affects women with less available capital to invest in agriculture, who find themselves farming on more marginal land. The increasing commodification of agriculture also results in more individual farming in which hired labour becomes important to supplement the labour of the farmer. This can result in women becoming more dependent upon expending capital on hired labour and gaining less help from their husbands and male relatives. However, this also enables richer women with capital to farm in their own right, to gain access to their own independent land and to hire labour to expand the area they can cultivate and intensify production.

The increasing vagaries of climate, in recent years, has also increased the risk of farming. As a result of this poorer farmers without surplus capital may tend to minimise risk by engaging less in commercial “niche” crop production, growing hardier crops, such as groundnuts, cassava, sorghum, bambara bean, and by engaging in multiple cropping systems. The farms of small cultivators may contract, as they invest less of their income in the risk of agricultural production and develop alternative livelihood options to supplement agricultural production. This is particularly prevalent among youth who do not have capital to farm on a large scale. As a result of this many male youth go into charcoal production to gain “quick” money. Many women also combine small scale farming with petty trading.

Among the poorer sections of agrarian settlements in Brong Ahafo are migrants from the Upper West and Upper East regions of Ghana. Many youth migrate seasonally, working as casual farm labourers, gaining some capital with which to return to their home towns to develop their own farming. Isolated settlements of migrant farmers can often be found situated far away from feeder roads only accessible through remote paths. Farmers in these settlements may often have fragile rights in the land they are farming. While rents may not be expensive, they may have to perform some services for the chief from whom they got the land. However, migrants are socially differentiated and there are many rich migrants farming in Brong Ahafo, who may have made large investments in agriculture and may have access to large networks of migrant labourers. In

the northern transition zone where land does not attract high rents, and can be easily gained since population densities are low, lack of rights in land is not a serious barrier for migrants with capital. Ability to invest in labour is often the major constraint in agricultural production in this zone. In the semi-deciduous forest areas of southern Brong Ahafo, land is scarcer and sharecropping arrangements become dominant in land transactions. In these areas availability of land may be more a constraint for migrants, particularly in the cocoa growing areas.

Agricultural development policies have tended to favour richer farmers and provide few options for small farmers. While soft loans and subsidised inputs for large farmers have not been in force in recent years, attempts to develop cashew and timber plantation projects favour those with land, and those with the capital and influence to gain land and hire labour or tractor services in clearing the land. The expansion of the plantation sector is likely to create land pressures for food crop farmers. The focus of agriculture on monocropping and row planting tends to favour farmers growing commercial crops, and not those engaging in multiple cropping as a risk reducing strategy or attempt to maximise investments in scarce labour. This category includes a large number of women, who are unable to secure prime land for commercial crops and who have insufficient land to higher the necessary labour to make large commercial farms. Farmers who are able to develop monocropping extensively by investing in labour and expanding areas of acreage are those that tend to benefit from monocropping technologies, although their profits are variable according to the vagaries of climate. Farmers without sufficient capital to take risks of expanded production tend to focus on growing hardier crops and a range of crops on smaller farm plots. Small and middle farmers who used to use inputs and ploughed their lands are among the losers. They are unable to use inputs successfully now, but have difficulty in cultivating their lands without inputs. Their plight has not been addressed by agricultural services. The agricultural services tend to work within a framework of the need to transform agriculture in relation to population pressures rather than the impact and failings of previous policy frameworks. Growing concerns with post harvest technology and storage tend to favour large farmers who can afford to store crops over months and not small farmers who must sell a large proportion immediately after harvest to meet debts, social responsibilities and to hire labour for clearing the next season's farm plot.

4.1.20 *Managing the environment under decentralisation*

Environmental management has acquired a high profile in Ghana at all levels, including the districts. Districts have responded to pressures to implement policies and create environmental institutions, committees and bye-laws.

In the Brong Ahafo, this is evident in a number of ways, including the creation of new bye-laws and procedures – for example, to regulate:

- the use of fire on farm and in the bush;
- charcoal production;
- hunting;

It has also led to the creation of new institutions to manage the environment, including:

- District environmental sub-committees
- Fire volunteers or ‘Fire Mobisquads’

However, these institutions and decision-making processes are often ill-served by the available information systems. Environmental policy tends to be informed by the same grand narratives earlier discussed, which draw on received wisdom about the environment not on the actual conditions on the ground. This in turn encourages a top-down approach in which rural producers are cajoled to change their ways. Unsurprisingly, the latter tend to feel alienated from policy frameworks, and distrustful of policy processes.

4.1.21 *Structures of decentralised environmental policy*

The framework for the current structure of decentralisation in Ghana was established by PNDC Law 207 of 1988. This enacted a new structure of devolved local government, within a three-tier structure of Regional coordinating Councils, District Assemblies and Town or Area Councils and Unit Committees.

The Local Government Act of 1994 (Act 462), the National Development Planning Commission Act of 1994 and the National Development Planning (System) Act of 1994 establish the framework for development planning.

Annex 3 of this report reviews the implications of these structures and procedures in detail. Below, we consider only their major implications for the practices of environmental management in the districts.

As regards decentralised environmental management, the regional branches of the Environmental Protection Agency are mandated to coordinate environmental planning in the districts and integrate them with national environmental plans and international commitments. Its responsibilities include:

- Initiating environmental awareness campaigns;
- Advising the District Assemblies on enacting environmental bye-laws;
- Helping to establish District and Area Council Environmental Committees.
- Coordination of Anti Bushfire Campaigns and work with the Fire Service to mobilise community level Fire Volunteer Squads.

At the District Assembly level, the intention is for environmental issues to be discussed at Assembly meetings. The Environmental Committee should then take up issues identified by the deliberation of Assembly members based on the experiences of their electorates. The Environmental Committees should recommend bye-laws to be discussed and ratified by the full Assembly.

Within the settlements, the Unit Committees and the Area Councils are responsible for implementing bye-laws, and collecting revenues from licences, permits for natural resource extraction and revenues from crops and other produce leaving the district. They are to initiate projects for the protection and enhancement of the environment. The Area Council planning process requires meetings between the Unit Committees and the community.

In practice these procedures are undermined by several factors, which are at odds with the spirit of the legislation (*viz.* establishment of democratic environmental decentralisation administered by elected representatives who are accountable to an electorate who participate in local level planning).

These factors include:

- The fact that the *Ghana Forestry Service* has been able to resist decentralisation, on the grounds that timber resources are national assets which need to be managed centrally, on behalf of the nation;
- The relative independence of the *fire volunteers* from the authority of the Environmental Committees;

- The roles of the *chiefs* in natural resource management, specifically their claims to ultimate ownership of land, as the allodial authority, and their rights to establish customary bye-laws independently of the District Assemblies;
- Chiefs are also being increasingly empowered by the central government to enact environmental bye-laws (for example, to control bushfires), and to punish transgressors;
- The fact that the District Chief Executives are appointed by central government and seen as representing the development policy interests of the government to the District rather than as the spokesperson for dominant interests within the district. The DCEs are accountable to the central government rather than to the district electorate over environmental policy matters (among others). Presently, reforms are being considered which will make the DCE an elected representative;

As a result of all these factors, it is difficult within the prevailing structures of district administration for Assembly members or Unit Committees to question environmental policy or to seek to adapt it to the needs of their constituencies. Environmental policy tends to be conveyed to the districts as a set of prescriptions which Assembly Members and Unit Committees are required to implement.

There are few avenues through which Assembly Members and Unit Committees can get access to dispassionate information on the environment. Most information is disseminated to the districts in a prescriptive form. There are no provisions for Assembly Members and Unit Committees to set up consultative community fora with their constituents, to examine environmental problems and devise suitable solutions (for example, concerning bushfires).

Given these constraints, the options open to Assembly Members and Unit Committees are extremely limited. Effectively, there are only three. They can either:

- Act as spokespersons for government environmental policy, advocating the relentless implementation of bye-laws (at the risk of unpopularity and future electoral failure);

OR:

- Ignore environmental policy or implement it only half-heartedly;

OR:

- Take advantage of the considerable confusion (as well as the conflicting responsibilities of different authorities and lack of accountability to community organisations) to engage in rent-seeking behaviour for personal benefit.

These three are not mutually exclusive, however, and all may be implemented simultaneously to a greater or lesser degree.

Given the close integration of the local elites with the national elites, the preferred option is often the first option, the implementation of punitive bye-laws, drawing on the narratives of anthropogenic destruction which dominate national environmental discourse. Since these rhetorical narratives usually allocate some form of blame, they can be picked up by powerful groups to further their interests. They then become projected into the local political arena as an 'environmental crisis', thereby justifying the introduction of bye-laws. These are likely to be accepted by local people only where they do not contradict their own economic interests.⁵ Where they do, then the consequence is likely to be social conflict. Thus, the dominance of crisis narratives within government agencies concerned with natural resource management, encourages confrontational environmental committees to come into being that do not reflect the state of natural resources at the local level nor the interests in natural resources. Had the environmental committees worked through other more negotiated frameworks which embraced various perspectives on natural resources or assets, they might well have been able to establish platforms through which various group interests in the community could work and negotiate and engage in constructive dialogue.

Thus, the net outcomes are likely to be that environmental policies:

- Are poorly implemented;
- Are given low priority;
- Lack empirical justification;
- Create a culture of blame;
- Are open to manipulation and politicization (this is particularly evident in conflicts over charcoal management)

4.1.22 *An interim assessment of environmental decision-making*

In summary, the existing approaches to environmental management in the district tend to be singularly ill-adapted to the interests of the small producers, particularly the poor. Environmental policy is, to an excessive degree, external in its derivation, top-down in its orientation, and

⁵ This point is developed further by Wiggins *et al* (2001).

punitive in its presumptions. The opportunities which decentralisation of local government presents for a more responsive and constructive approach have not yet been realised.

This study seeks to develop an alternative approach. The premise adopted here is that natural resource management is concerned with complex relationships between people and resources, which often interact in unforeseen ways, producing unexpected outcomes.

In such a complex context, effective production of information and knowledge requires:

- The creation of inclusive frameworks which bring together the understanding and perspectives of a range of natural resource users;
- The creation of democratic platforms for learning and decision-making
- The creation of information systems which rely on a two-way flow of information.

On the one hand, policy-makers need to be able to gain empirical data on conditions within the district. On the other, natural resource users need to gain new tools to help them:

- Understand their environment
- Apply the principles on which they are agreed to the management of their specific situation;
- Articulate their problems in policy fora, to policy makers, and other resource users.

The implications of this are considered further under Output 2, and a project proposal is developed in Annexes 4 & 5 to take the agenda forward.

4.2 Output 2: *‘Potential alternative or developing and delivering appropriate participatory management approaches to benefit the poor identified’*

4.2.1 The Way Forward

It is the argument of this report that research on agriculture and natural resource management in the Brong Ahafo is not responding well to the needs of the farming community. New ways need to be found of identifying the constraints upon farm practices, and responding to them in line with farmer interests.

New approaches are required to improve decision-making in natural resource management at all levels from local-level producers up to national-level administrators.

Hitherto, most agricultural research has ended up expanding the areas of influence of a state or policy sector through the distribution of new technologies and building up of a clientele of faithful supporters. The arguments here presented are opposed to this type of approach. Rather, institutional innovations are required which:

- a) Promote feedback on the environment and production systems from various localities;
- b) Lead to the creation of information systems which regularly update themselves and which policy makers can use to learn about the conditions which various categories of people experience in their daily life.

These information systems should facilitate debate at the various policy levels to foster more informed and appropriate policy options. The interface between administrative organs and perceptions of different people within the localities, and the learning processes that emerge from the interface at both these levels, is what will ultimately determine if a sustainable development process can be implemented.

Policies need to be informed by the experiences of citizens, and citizens need to understand the avenues through which they can create demands for appropriate policies.

The proposed project (see Annex 4 & 5) seeks to promote such a perspective on policy development.

4.2.2 Taking Account of Complexity

Given the complexity of social arrangements, micro-environments and change, sustainable production systems cannot be conjured up on experimental stations and transformed to the localities as technological prescriptions in a top-down fashion.

The premise for a better policy process is the setting up new information systems which are:

- Inclusive
- Involve a consultative process with a wide range of interest groups within the rural areas
- Bind policy-makers to downward accountability.

These information systems need to collect empirical data on the different interest and livelihood groups and their natural resource base, and the economic potential of the various localities. They also need to reflect the perceptions and interests of the various groups within the localities.

4.2.3 Engaging with Decentralisation

The *institutional mechanism* for the validation of policy prescriptions must ultimately be the democratic process.

Whatever its limitations, the process of decentralisation in Ghana offers the only avenue through which rural dwellers come into contact with development administration and can have any say in development planning.

The shortcomings of the system are not necessarily the product of decentralisation. The contradictions tend to come, rather, from the higher echelons of administration:

- From ministries, departments and regional co-ordinating bodies who issue top-down directives and expect the districts to comply;
- From government agencies who expect districts to implement government policy without a debate on the appropriate needs of the districts;
- From departments which think they are too important to decentralise.

More positively, the legal framework for decentralisation provides ample scope for:

- Accountability
- Civil society participation in development planning
- Communities to develop their own development plans.

It requires District departments to collaborate in developing District sector plans which are ratified by an Assembly with a majority of members. It requires Unit Committees and Area Councils with an elected majority to initiate development plans which have been discussed with the communities. Strengthening these linkages has the potential of building upon civil society participation and making District Assemblies more accountable to a rural electorate.

4.2.4 Other Interventions

The major focus of the programme is in building information systems from the local level up and facilitating dialogue between the local level and other development management institutions. However, a critical element will be in building linkages between the local level Area Councils/Unit Committees and the District Assemblies, Regional Coordinating councils, government agencies and operational NGOs, and generating interest in the programme.

While there are constraints within the current framework of natural resource management, there is the potential of building synergic linkages with existing projects and programmes in the field of decentralisation, and also with some recent policy concerns and new directions. Several donor projects now focus on strengthening the district planning process, attempting to enhance planning procedures by facilitating more inclusive consultation, more transparent procedures governing allocation of resources and improved responsiveness to civil society groups. Examples include (see Annex 4.2):

- the *DFID District Support Programme*, which works at the level of the district administration coordinating the planning processes and programmes of various departments and integrating their activities and potentials. The DFID programme has been built into the district Offices of the Ministry of Food and Agriculture. The proposed project can complement these initiatives, by building a local demand for service delivery and information which can further enhance the desire to build more efficient, transparent and responsive decentralised development services.
- *CARE*, which is developing a programme of community support for sustainable development in the Wenchi district. There is the potential to build linkages in which the project contributes to the methodology that CARE uses and the information base on which it develops interventions;

- The *Ghana Forest Service* is concerned with developing a ‘Ghana Forest Forum’ and exploring an institutional framework based around decentralisation in which civil society organisations, farmers and forest users can make greater input into forestry policy deliberations, to act as a counter lever against policy distortions, against the dominant interests of industry and create demands for reforms in rights to forest resources and downstream benefit flows;
- The *Ministry of Lands and Forests* is concerned to introduce greater decentralisation of land and forest resource administration, and introducing more transparent systems of administration with accountability to civil society groups;
- Several donors are supporting programmes for promoting decentralisation, and more transparent policy planning processes based on improved collection of data, analysis and management of data, and dialogue between local level planning processes and district administration planning. This group includes GTZ, Danida and a DFID-funded Khanya-led community-based planning project working on a pilot basis in the Ashanti region (as well as in Uganda, India and elsewhere).

The proposed research is complementary to these projects. Indeed, it could be argued that it is a necessary prerequisite for them to be effective. (For example, GTZ seeks to work through community fora. However, without the evidence of research which can identify social processes and their implications for development initiatives, the social representation of a community forum remains unknown.)

The Ghana Poverty Reduction Strategy (GPRS)

This national document is still in draft (the most recent version is dated February, 2002). It is of particular interest to the project in respect of two dimensions:

- a) Its commitment to reinforcing and extending *the process of local government decentralisation*.

Thus:

“In terms of governance at the national level the need is for a vigorous and progressive deepening of decentralisation and the devolution of power. A combination of the latter with permanent mechanisms for a symbiotic relationship between communities, NGOs, civil society organisations, private business and the public sector and between levels of

government will strengthen national government and nation-building through dialogue and consensus.” (2002: 28)

Though the resourcing of the programme remains uncertain, the GPRS acknowledges that a number of steps need to be taken to make local government more effective, including the creation of a national Local Government Service, to staff the district-level bureaucracy, review of the Local Government Bill to reinforce local autonomy, and strengthening of the local revenue base.⁶

b) The orientation of the GPRS with respect to *natural resource policy*.

The draft document is particularly weak in this respect. For instance, the GPRS advocates strengthening of the environmental legislative framework in much the same way as is now being done by district assemblies- an approach subjected to criticism in this report. Thus the GPRS states:

“In order to improve the environment and natural resource management, existing laws and regulations relating to the protection of resource utilisation must be implemented. The Bush Fire Law will be reviewed, strengthened and enforced. Programmes such as community fire fighting volunteers must be strengthened with allocations from district assembly common funds by districts.” (p78).

This favours the kinds of punitive policing attitudes to environmental management of which this report is particularly sceptical.

The GPRS’ overall strategy for the agricultural sector is also questionable as a means to reduce poverty: For example:

“Government will need to play a supportive role in achieving the transformation of the agricultural sector from its subsistence orientation to a commercially attractive, viable, and dynamic activity. This is vital for the achievement of sustained equitable growth. However, agricultural transformation will not be achieved without a corresponding transformation of the attitudes of individuals to work in general and commercial farming in particular. It requires a transformation from a culture of subsistence to a culture of business focused on profit and accumulation. Pivotal to the process of change in the rural environment is the reform of traditional land administration systems. Under present conditions land as an asset is excluded from the national economy and its value denied to the farmer. It is not tradable. Legal title to land within the concept of communality is an essential prerequisite to attracting entrepreneurship into farming and the promotion of agricultural industry. Without legal title

⁶ Notably, however, the main means by which strengthening of the local revenue base is to be achieved appears to be through the encouragement to Districts to “develop innovative revenue and funding sources for which training will be provided” (p.125) – which at first site does little to address the fundamental imbalances in the revenue base. Notably, also, the traditional authorities are seen as a part of the decentralisation process, not – as many would view them – as an impediment to it. (p.124)

to land there can be no transformation. Effective management of the transformation demands an integrated cross-sectoral approach and dynamic government support (p.27).

While this is a somewhat piebald position (the meaning of the phrase “legal title to land within the concept of communality” is particularly ambiguous⁷), the main vision would appear to be one of transformation of the agricultural structure by agribusiness (integrating farmers through credit lines, with the potential which this introduces for land appropriation from the small farmer sector, etc.). Issues of fine-tuning agricultural research to the needs of the rural poor and improving feedback links are not addressed. Elsewhere the GPRS discusses the creation of agribusiness linkages between small farmers and large companies and the extension of credit lines through these arrangements. However, it does not address the mechanisms to be put in place to ensure that the interests of the rural poor are met by this process and that agribusiness does not become an avenue to promote the interests of richer strata of farmers or a means of dispossessing the poor and tying them to schemes which are not in their best interest. Again, the present report is highly sceptical of policy initiatives of this type – in that they could well favour a class switch which is unlikely to be either environmentally or socially sound.⁸

In summary, the GPRS is a key reference document for the proposed research, and may well have implications for it, both positive and negative. It will be important for the project to maintain working relationships with the GPRS national team, and to keep an eye on future iterations of the document.

⁷ This seems to be a mere restatement of top-down trickle down theory through progressive commercial-oriented farmers.

⁸ While credit, marketing and storage clearly are important issues, they were beyond the scope of this study which essentially deals with the forest/agricultural interface. At present few farmers receive credit and most of them make independent investments within their farm. While the GPRS and some researchers are enthusiastic about extending credit, this has to be looked at critically, particularly given the patterns of credit disbursement in the 1970s and their linkages to outgrower schemes. This will be particularly important in the proposed study of the plantation sector (see Annex 4).

Storage is also a complex issue given that the dominant crop yam, has complex and technically exacting storage systems which do not easily fit into the traditional/modern dichotomy of agricultural modernisation. The failure of several recent attempts by donor-funded projects to improve yam storage in West Africa would warn against the attempt to broaden the proposed project to include this theme.

There are also highly complex issues involved in marketing. For instance, an analysis of markets must look at the infrastructure of existing markets and physical market places and the regional integration of market centres with transporting networks and marketer networks. This would seem to be a whole long-term study. Thus, the present report limits itself to the impact of market pressures on changing cropping systems and varieties from the farm perspective.

4.2.5 Entry Points for research

In the conventional participatory approach, researchers have tended to focus on developing more flexible and process-oriented modes of planning using participatory research tools. The main role of the researcher is independent facilitation. The researcher brings the expertise of knowing how to facilitate a process of negotiation, to help identify problems and solutions, which the community then agrees and implements collectively. This is problematic to the extent that the barriers to effective participation may lie not in the absence of independent perspectives but in scarcity or conflict over resources.

By contrast, the potential entry point into the community advocated here is for research to act as a provider of information. Collecting and disseminating information in this way would have four objectives:

- To gain a better understanding of the social groups within the communities, their livelihoods, their policy perspectives and their interests;
- Provide information to these groups to facilitate the development of bridging ties through which they can articulate broader group interests;
- To provide them with information which would facilitate their ability to develop strategic linkages with other groups and place their demands to policy-makers.
- To examine the potential of local-level participation in research processes, so that local groups can generate their own research, process their own data and information, and be able to update information systems and utilise them for placing their demands in the policy process.

This entry point creates a different role for the researcher than the PRA process. The researcher no longer plays the role of the facilitator. The outcome is no longer to bind the whole community to a community plan of action in accord with policy processes.

In this scenario, the role of the researcher is rather to provide information and support information-generating processes. The outputs of research become information systems that facilitate communications between policy processes and natural resource users, and enhance feedback and accountability.

4.2.6 The Role of Information

At present, information systems within the districts are weak.

There are no institutionalised processes for generating a knowledge base on the needs of localities and the different interest groups that reside in them.

This has a number of consequences:

- ❑ It becomes difficult for District administrations to develop District profiles
- ❑ It also becomes difficult for Assembly Members and Unit Committees to present their needs beyond the parochial concerns of their own villages.
- ❑ The Districts are unable to place their needs and demands to higher up administrative organs.
- ❑ The Districts become subservient to top-down national prescriptions imposed by Regional Co-ordinating Councils (which are frequently based on minimal and fragmentary national-level data substantiating a framework that is essentially built on received wisdom, not local evidence).

To develop policy processes that are more inclusive and respond to the needs of rural dwellers, the following steps are required:

1. District level information systems need to be created;
2. There is need to process and update this information in ways which will enable the concerns of various localities to be reflected in planning procedures;
3. This requires the two-way communication of information between localities and their Unit Committees and the district administration.
4. Unit Committees and Area Councils need to be able to collate basic information on such issues as:
 - their settlements,
 - the characteristics of the population in the settlement,
 - the different livelihood groups within their settlements,
 - the policy interests of different groups,
 - the natural resource base and natural resource conflicts,
 - the incidences of bush fires, etc.
5. Unit Committees and Area Councils need to be able to feed this information to District Assemblies and also request information on trends within the districts.

6. This information should also be available to the District Assembly members and the sub-committees, and should inform their deliberations.
7. It should then contribute to the formulation of a district profile which informs the planning process and is also conveyed to Regional Coordinating Councils.
8. These information systems need to be built from the community level upwards to achieve responsiveness to changing conditions and the interests of people.

4.2.7 The Proposed Project

Improving the quality of the information systems at the local level, and improving the communication linkages between District administration, District Assembly, unit Committees and farmer/natural resource user groups are thus critical to environmental democracy, and central to the aims of the proposed project.

The dual role which the project can make is to generate and disseminate research findings of value to local resource users, and to thereby reinforce the incipient structures for environmental management which exist to serve their needs.

Tasks

The major tasks of the project proposed here should be to:

- a) Identify and work with the interest groups at different levels in the system of decentralisation from the localities with their Unit Committees through the District administration up to the regional level.
- b) Identify their information needs and the major constraints which limit their ability to collect, process and communicate information.
- c) Strengthen and facilitate their information-generating and communicating processes
- d) Utilise the capacities of the research team to generate information which can in turn be used at the local and district levels (this would include access to research services findings, national databases, remote sensing information, geographical information systems, etc.)
- e) Strengthen the institutional context for environmental decision-making at local and District levels
- f) Bring all of [a-d] together to improve the quality of environmental action within decentralised government.

The role of networks

Natural resource issues are not constrained by the settlements in which people live. The economic activities of different producers are integrated into a regional economy, in which a wide range of producers contrive to define the niche which one particular set of producers can occupy. Many of the problems in natural resources management which occur in a particular situation are typical of a much wider zone, with variations in the processes of adaptation, conflicts, negotiation of conflicts, and institutional innovations.

One means of giving natural resource users greater access to information is to develop *regional networks* which would bring farmers together to examine particular problems in natural resource management, different perspectives on the problem and different approaches to the resolution of the programme. This could include situations involving conflicts between different natural resource users that are replicated in a number of localities, such as between charcoal burners and (yam) farmers, where reflections on the different histories of conflict and negotiation, could promote social learning.

It could also involve situations in which different natural resource users have worked out a set of different adaptive responses to similar problems, or where the adaptive response in one area has consequences for other natural resource users in other areas.

This component of the programme will involve:

- A series of exchange visits involving farmer and other resource users;
- Workshops which seek to draw lessons from various experiences;
- Visits to research organisations and government services to exchange experiences.
- Other innovative means (for example, rural radio, and television) to help share and disseminate ideas, and by so doing, to give back authority to the rural producers, and enhance their voices in decision-making processes.

The objective of this networking would be to bridge experience between natural resource users, to enable them to address problems requiring collective actions and to enable them to draw up a framework of reference which enables them to engage in dialogue with policy makers.

The final output of this component would be workshops between policy makers and rural producers in which the networks of natural resource users place their demands and projects to the policy makers.

The types of themes to be addressed (which will need to be identified by participating networks of farmers) could include issues such as the following:

- Yam, charcoal and tree regeneration: Is there a problem? What are the solutions to good relations between charcoal burners and farmers?
- Maize production with inputs, plus bush fallowing and management of the soil.
- Changes in yam producing technologies.
- Bush fire management: the farmers' perspectives in different areas.
- Vegetable production technologies and stream conservation
- Plantation development and its impact on landholdings and the poor.

This could culminate in '*weeks of action*' in the districts, which would attempt to raise the profile of natural resource users in the rural areas. Here again, the media (local, regional and national) would have important roles to play.

Resource foci

The Project should cover the management of natural resources control of which has been largely or entirely devolved to the district level (eg. agricultural products, of the types discussed above, tree plantation development, and farm-based products such as charcoal).⁹

The Brong Ahafo is likely to be the focus of a major externally-funded plantations programme in the coming years. This is not uncontroversial. On the evidence to date, the programme may well favour exactly the sorts of entrepreneurial approaches to resource capture and land development which have already blighted post-independence agricultural modernization in the region, largely to the detriment of the small producer. Information and institutions are again the key. If the small farmer community is to derive benefit from the scheme, it is essential that its members – and their elected representatives – are well-informed about it, and are able to influence its implementation. Developing an effective interface between local producers, elected representatives (Unit Committees and District Assemblies), and officials of the devolved and non-devolved public

services (agriculture and forestry) is essential to both these tasks.

Project Outputs

In summary, the project outputs will focus on improvements in three areas of intervention:

1. *Quality of information* available at district level
2. *Networking* between farmers
3. *Articulation of the needs and problems* of rural producers with the democratic organs of local and regional government.

The project outputs are presented in the draft Phase Two Logframe (see Annex 5).

⁹ Note that only recent tree plantations would be considered here. Management of long-established plantations of the Forestry Department/GFC has not been decentralised to DA level.

4.3 Output 3: *'Increased awareness among NR researchers, policy-makers and development agencies of the types of changes which will be needed to ensure that current decentralisation and natural resource management policies contribute to poverty alleviation'*

The original intention was for awareness-raising activities to be undertaken before the submission of the present report.

However, in view of the scoping character of the present study, the Team Leaders felt that it would be inappropriate to present the findings formally to their partners without being able to give them some indication of the likely follow-up from the funding agency. The decentralisation process in Ghana is not yet well-advanced, and there are a number of sensitivities arising out of this research which can only be effectively addressed in the context of an action-research programme.

Formal awareness-raising activities have therefore been withheld until the report is submitted. They will be conditioned to some degree by the likely follow-up from the funding agency.

Three sets of activities are envisaged:

a) Discussion of findings with resource users, in local informal settings.

This element of the programme will proceed in April-May. The field research team has by now established good rapport with a range of resource users and decision-makers, at District and locality levels. It is envisaged that the field team will return to its study sites, in sequence, to discuss the findings in informal settings with the various groups with whom they have been working over the last year. These discussions will take place largely in vernacular languages and in a manner appropriate to the needs of the stakeholders involved. Thus, formal workshops will be avoided, and the accent placed on carefully targeted meetings to maximise the participation of the relevant categories.¹⁰

b) Formal presentation of findings at a national policy-makers workshop or workshops

¹⁰ Note (6/02): These meetings have now been undertaken, and the research report is being drafted. The feedback was extremely well-received by the villagers.

This element is likely to take place later in the year, ideally when some fairly firm indications can be given of the likely follow-up envisaged by the NRSP. It will involve the two research leaders (Ghana and UK), and a range of partners. A formal one-day workshop in Accra was originally envisaged, to present to, and review findings with, key national makers (senior Ministry staff, academics, parliamentarians, international partners active in the Brong Ahafo region and/or in other aspects decentralised development, etc.). However, the research team now favours an approach tailored more to the interests of particular constituencies, with a view to strengthening the voice of each. This would help diminish the risk of suppressing certain opinions in the interest of consensus, where diversity of opinions may be of greater value to the project design.

The following series of three separate workshops is now proposed (6/02):

- *Workshop One:* National government agencies including Ministry of Local Government, Environmental Protection Agency, Ministry of Lands and Forests, Forestry Commission, Ministry of Food and Agriculture, etc. and agencies which are central to coordinating the GPRS.
- *Workshop Two:* Donor supported initiatives in decentralised management and natural resource management and NGOs;
- *Workshop Three:* District Authorities including representatives from district administration, Environmental Committees, decentralised departments, Assembly Members Area Councils and Unit Committees, sand other local level environmental management including Fire Volunteers and Chiefs.

c) *Dissemination activities:*

Three sets of dissemination activities will be undertaken:

- ❑ Those involving national and local radio, NGO fora, etc.
- ❑ Policy-oriented publications suitable for work in progress such as the *ODI Natural Resource Perspectives* and *ODI Working Paper* series, and web-postings, on the ODI Forest Policy and Environment Group Website, of the annexes to this report.
- ❑ Academic research seminar presentations and publications.

The first of these will need to be handled with particular care, given the ease with which environmental messages can be ‘hijacked’ by particular interests, to convey messages which may be quite at odds with those intended. But there are a number of innovative possibilities, all of which may help to assert the ownership and authority of the small farmer community over their own development processes.

4.3 Comparison between planned and actual outputs

The present study has achieved the outputs laid down in the logframe, at a level appropriate to its conception as a scoping study. The only qualifications are:

- The revised schedule for Output 3, as discussed immediately above (Para 4.3).
- The presentation of a single research proposal rather than three separate research topics (per OVI 1.1/1.2).

The original intention – to provide three alternative research options – proved to be out of keeping with the socio-political, rather than technical, bias of the research findings. The complex nature of these findings demands a process-oriented approach in the next phase, drawing on new information and new understandings to build up consensus for change in environmental decision-making, rather than the pursuit of single-theme research ideas. Thus, different options for change will be accommodated within this learning-process orientation, depending on the interests of the parties to the action research, and do not need to be specified in advance.

OVI 2.1 (local capacity to carry forward the research) is reflected in the formation of a competent team of research assistants, enjoying the confidence of the Ghana Research Leader, which is available to form the nucleus of any future field research grouping. The results of the District Assembly surveys are in the process of being written up by one member of this field research team as an M.Phil thesis, to be presented at the University of Ghana.

5. Research Activities

5.1 Research Methodology

In broad terms, two methodological approaches can be used in a study of this type:

- A case study approach
- A statistical approach

The former is appropriate where one wishes to investigate new relationships and/or develop new understandings. The latter is more favoured where the aim is to test a specific hypothesis or a model. The present study is of the former type, and thus a case study approach has been used.

A statistical approach would be doubly contentious in the context of the present research. Since the data was predominantly about farmer perceptions, it contains a lot of ‘noise’. Such data is better sorted out into classes rather than as averages. Because of this, there has been no attempt to carry out analysis of regression. Economic researchers often ask farmers to give their acreages, and on the basis of their perceptions come out with ordered data indicating averages.¹¹ This is further analysed through regression analysis. In a situation such as the present, this approach would be fundamentally misleading. Farmers often do not know the acreage or yields of their farms but are pressured into responding in particular ways, whether or not these are appropriate to their circumstances. Data on large holdings is likely to be particularly inaccurate, given the tendency to exaggerate.

This justifies the preference in the present study for the sorting of responses into data classes and bands by frequency, rather than by statistics derived from the mean. If such statistics had been required then this would have to have been done by measuring out field plots, take measures of farmers yields at harvest time, keep weekly figures of labour time spent in the field and weekly budgets of farm expenditure. This would have been far beyond the allocation of time and funding for this scoping study.

¹¹ A case in point – to the extent that it is evidence-based – may be the draft Ghana Poverty Reduction Strategy (‘GPRS’, February 2002). This asserts that “the average farm size is small (less than 1.2 ha). Hired labour is hardly used by this group. The average food crop farmer has limited contact with the product market and is unlikely to use fertiliser, insecticides, high yielding seed varieties or irrigation-based techniques of production”. These “facts” are not corroborated by our report which found high use of labour by all farmers, and complex situations in other input usage related to historical policy and ecological factors, and market integration.

The statistics used here were simple descriptive measures of percentages for different clusters. A case study approach was used to explore production relationships in different settlements, with different ecologies, different production systems and different histories of integration into markets and policy frameworks. The approach was not based on the search for 'typical' conditions but rather contrasting conditions and different cases. The primary concern was with understanding *variability*. Therefore only the most limited significance should be attached to averages and related statistics. Qualitative research consisted of informal case studies of experiences of particular farmers and individuals, and explanations of the differences between settlements by farmers. The findings of the quantitative data were taken back to settlements and discussed with groups of farmers for explanation.

The aim was to gain samples of youth, women, men, indigenes and migrants, which would enable different experiences to be collated rather than gain 'representative sample' of village populations. 'Migrants' proved particularly problematic, since this is a highly differentiated category, which includes local as well as long distance migrants.¹²

The research has not been in a position to disaggregate different groups according to various standards of social differentiation. The current fashion of differentiating rural populations into 'the poor', 'very poor' and 'non-poor' has not been followed, as the data decomposes in different ways. Arguably, however, such an approach would do little to advance understanding of processes of social differentiation, particularly in a context such as this where labour markets are complex, both socially and occupationally, and subject to life cycle influences. Migrant labour in West Africa is highly differentiated and often constituted by mobile labour networks. Within these networks, labour contractors and migrant farm owners form an upper echelon of successful migrants who then move into petty trading, transport etc., while the lower echelon is made up of recent migrants who are usually youths taking up their first labour contracts. While differences did appear in the present study as regards male and female farming strategies, there was no clear trend for migrants or specific groups of migrants originating from particular areas. Thus, the report is not able to specify particular social groupings of 'the poor', though it does show processes and pressures which bring about social differentiation. This helps us understand different farming strategies and pressures on farmers in the Brong Ahafo. The approach can then

¹² Problems were also caused by the unwillingness to identify young adult and adolescent men as farm workers (they were seen as too young to be so classed). This has been identified as an issue for further deliberation in the full study.

be built up to give a more detailed analysis of the processes of social differentiation. This may prove more helpful than starting from a static set of categories of ‘non- poor’, ‘poor’ and ‘very poor’.

5.1.1 Choice of study areas

To understand the complex institutional arrangements that exist for the control and administration of resources in the transitional zone of Ghana, a number of case studies were developed in distinct ecotones in the Brong Ahafo. These cases were selected to reflect contrasting situations rather than to be representative of typical Brong Ahafo conditions. They sought to contrast:

- different systems of production based on natural resources in different environments;
- different types of adaptations to environments;
- multiple land rights and processes of conflicts and resolutions that occurred in different land use systems.
- Different livelihoods strategies.

One important criterion for research was to compare natural resource management in the northern savanna-forest mosaics with that in the southern fringes of semi-deciduous dry forest. The northern savanna forests are characterised by large areas of parkland in which small robust trees dominate interspersed with grasslands dominated by *Andropogon* sp. Gallery forests with typical semi-deciduous pioneer species occur in riverine areas. The semi-deciduous forest fringe is, very broadly, characterised by high forest tree species, although the canopy is frequently open and many herbaceous and grassy species dominate the forest floor. The semi-deciduous forest has been largely disturbed by farming, invasion of weed species, and fire, and frequently only tall emergents survive with an under-storey dominated by *Chromolaena odorata*.

A second important criterion defining the selection of settlements was the need to examine the impact of agricultural policies on farming practices and the landscapes in these two areas. This resulted in the selection of settlements which were situated near state farms or state agricultural delivery services and settlements which lay beyond the main zone of influence in extension services. This enabled an investigation of the impact of input usage on the environment and the impact of changing policy frameworks to agricultural subsidisation on farming practice.

5.1.2 Study sites

- ❑ In the northern transitional parkland environment *Subinso*, situated 2 km from the Branam State farms, was selected to represent a settlement which lay within the heart of agricultural input delivery systems.
- ❑ *Mansie* and *Weila* were selected to represent settlements which lay beyond the influence of agricultural input and mechanisation services.
- ❑ In the semi-deciduous forest fringe, *Kokoago* was selected to represent a settlement in the vicinity of state agricultural services.
- ❑ *Buoku* represented a settlement with low dependence on state agricultural input delivery systems. Buoku also represented a settlement in the immediate vicinity of a forest reserve.

Additional study sites were also selected in the transitional parkland, in the area of Nsawkaw (Nsawkaw town, and the neighbouring villages of Tanoso and Njau, and Atuna, a settlement of Dagau migrants 12 kms. from the road). These sites (and also, in part, Weila) were selected because of their interest in relation to charcoal production, as will be discussed below.

5.1.3 Charcoal as a case study of multiple land use conflicts

To understand the complex institutional arrangement which govern multiple land uses the study focussed on charcoal production. During the period of research, charcoal production had become an important policy issue in the area. Some district administrations in Brong Ahafo were attempting to ban charcoal production and others were attempting to regulate production.

Conflicts over charcoal production between different interest groups in various settlements were common. These groups included migrant Sisala charcoal burners, youth with interests in charcoal burning, and chiefs and elders attempting to control the charcoal trade. Different settlements were chosen to reflect variations of conflicts and negotiation. At Mansie, migrant charcoal burners had been encouraged to leave the settlement a few years back and local youth were now in control of charcoal burning, but in conflict with elders. At Weila, migrant charcoal burners had recently left the settlement as a result of regulations introduced by chiefs and elders and youth were attempting to establish control over charcoal. At Nsawkaw, charcoal was still being produced by migrant Sisalas, but there had been conflicts between charcoal burners and farmers over rights over trees, and conflicts between chiefs and district assembly members and unit committees over rights to regulate charcoal. As a result of this interest in the management of charcoal, northern

parkland communities, in which charcoal production is focussed, are more represented in this study than semi-deciduous forest communities.

Research focussed on developing an individually administered questionnaire which examined farming practices and strategies, livelihood options, use of other natural resources, perceptions of the physical environment and of policy processes. These interviews sought to gain representation for different groups of farmers including migrants, women and youth (see table 5.1). In addition a number of informal group interviews were initiated, particularly to explore resource conflicts, as in the case of groups of migrant charcoal burners and youth, but also to solicit women's perceptions. Select interviews were also held with small groups of farmer after the survey had been analysed to solicit feedback and insights of some of the findings. Informal group discussions were also held with farmers at Atuna, situated off the road behind Jensoso, a small settlement of about 500 migrant Dagaabas who had acquired land from the chief of Jensoso. At the large town of Nsawkaw the area under investigation was not the whole settlement but the area under the jurisdiction of one Assembly Member, which included part of the town and the two outlying villages of Tanoso and Njau. This enabled the political dynamics of the relationships between different levels of administrative personnel to be observed and their ramification in some of the processes of conflict and negotiation in natural resource management, particularly around charcoal.

5.1.4 Assembly Members Survey

A second survey of 35 Assembly Members and 55 Unit Committees was also carried out in the Wenchi district to solicit information on the processes of rural administration and perceptions of the role of natural resource management in district administration. Interviews were also held with key personnel in the district and regional administrations. The results of this are in the process of being written up as the M.Phil thesis of Eric Sam-Quartey, a member of the research team.

5.1.5 Land cover change sub-project

During the course of the research, an additional land cover change sub-project was agreed with NRSP management, and supplementary funding provided. This study was launched in February 2002, and will report in April or May. It is examining the dynamics of land-use change in the northern transitional zone and the extent to which the land cover has been transformed by human intervention. The study is being undertaken by the Remote Sensing Unit in the Department of

Geography, University of Ghana, Legon, under the direction of the Ghana Project Director, Dr. KS Amanor.

Subject to a positive assessment of its findings, the experience developed in this sub-project would commend it for inclusion in the full research study to follow the scoping phase of the research.

5.1.6 Other aspects of research management

Two workshops were held by the research team – a one-day inception workshop in Oxford (attended by the UK and Ghana project leaders, the UK economist and a representative of the NRSP) and a 2-day mid-term field workshop, at Dodowa in Ghana (attended by all three senior members of the research team, and the four research assistants). The inception workshop was preceded by a preparatory meeting in London.

The original plan to involve key stakeholders and informants in an initial workshop in Ghana was dropped, following indications that excessive use of workshops in other programmes was already leading to low participation and disappointing results. Individual interviews and small group meetings were anyway felt likely to produce a richer set of responses given the innovative (and somewhat sensitive) nature of this research.

Table 5.1 Profile of the survey area

Population characteristics	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	
Men	56	52	56	44	58	51	52
Women	44	48	44	56	42	49	48
Migrants	14	15	68	20	91	77	45
Northern migrants	.	2	39	10	6	26	15
Akan migrants from Central and Ashanti Regions	.	.	1	.	6	10	2
Volta Region migrants	.	.	1	.	2	6	1
Migrants from within Brong Ahafo	14	13	28	10	77	32	27
Youth under 35	34	41	39	38	40	53	40
Under 45	66	56	64	58	70	71	63
Ethnic composition	<p>Nafaana who migrated into Deg (Mo) area before the 20th century</p> <p>Deg (Mo)</p> <p>Brong and Deg with large number of migrants from Upper West Region</p> <p>Brong with Migrant Dagaaba farmers from Upper West and community of Sisala charcoal burners</p> <p>Short distance-migrants mainly from around Techiman who came to farm cocoa</p> <p>Mainly migrants from Dormaa, and Upper West</p>						
Ecology	Savanna-forest parkland			semi-deciduous forest			
Size of sample	50	54	80	101	53	51	389
Approximate population	1100	1800	3000	5500	600	1000	

6. Environmental Assessment

6.1 *What significant environmental impacts resulted from the research activities (both positive and negative)?*

- This is a scoping study, which sought to develop new knowledge about the environment and its exploitation, and thus its impacts are yet to be felt.

6.2 *What will be the potentially significant environmental impacts (both positive and negative) of widespread dissemination and application of research findings?*

- The full study which is proposed should improve the quality of environmental management in the Brong Ahafo in a number of ways:
 - ❑ By improving the quality of environmental information available to decision-makers (including through the use of new technologies, such as remote sensing);
 - ❑ By bringing environmental decision making more firmly within the democratic process;
 - ❑ By reducing conflicts between resource users, and opening up democratic channels for their resolution;
 - ❑ By giving more voice to the poor and marginal (including poor women and migrants);
 - ❑ By better adapting natural resource research to actual on-farm constraints;
 - ❑ By improving the information base on controversial aspects of natural resource policy (such as tree plantation development).

To the extent that there are potential negative impacts, these relate largely to the danger of stimulating inappropriate responses from local authorities, which seek to give proof of their environmental concerns. The long-term aim of the project, however, is to give environmental decision-making a more rational basis, and hence to counter such 'gesture politics'.

6.3 *Has there been evidence during the project's life of what is described in Section 6.2 and how were these impacts detected and monitored?*

- Not yet (this was a scoping study). The future environmental impacts of the proposed follow-up study will be monitored by such indicators as use of, and demand for, improved information to support environmental decision-making; information sharing within farmer networks; increased dialogue between policy-makers and resource users; reduced conflict over natural resources and increased channelling of conflicts into the democratic process; broadened participation in environmental decision-making at locality (Unit Committee, Area Council), District Assembly and Regional levels.

6.4 *What follow up action, if any, is recommended?*

N/A

7. Contribution of Outputs

As a scoping study, this project's Outputs are to be judged against the objectives of the follow-up research-action programme outlined above.

In summary, the Purpose-level OVI's have been achieved at levels appropriate to a scoping study. The present research report provides a strong empirical foundation on which to build the proposed programme. This should be concerned with improving the quality of management of all natural resources in the Brong Ahafo, not merely those currently managed under CPR. As will be evident from Section 4.1.8, above (see also Annexes 1 & 2), common pool regimes do not exhaust the resource management possibilities in this region, and are anyway subject to transformation into various forms of privately-managed resources, where demographic and other forces encourage this.

The Project Proposal, derived from this Scoping Study seeks to overcome the following weaknesses in the policy environment:

- ❑ Natural resource policy in the Brong Ahafo is unable to generate benefits for poor people because the knowledge on which it is based is largely externally-derived, and lacks a foundation in local realities and circumstances; policy development is thus prone to draw upon crisis narratives which stigmatise local producers and alienate them from policy processes;
- ❑ The new opportunities which have been offered for District Assemblies to develop their own policies and legislation have similarly suffered from the non-availability of empirical evidence (for example, on the availability of the resource, and the impact of production techniques and strategies on its condition); this has rendered the District level prone to a political form of decision-making, detached from the broader contexts of resource utilisation.

Thus, the Goal of the Natural Resources Systems Programme (NRSP) - to generate benefits for poor people by the application of new knowledge to natural resource (NR) systems – is a valid one in the present circumstances. The evidence of the scoping study supports the judgement that lack of knowledge is a constraint upon environmental decision-making, and thereby impacts negatively on livelihoods.

The present report sets out in detail:

1. the resource constraints which condition the livelihoods of small farmers in the Brong Ahafo, and the decision-making processes through which they respond to these constraints, differentiating the responses of different classes of resource user (poor and rich men and women, indigenes and migrants);
2. the capacities and limitations of the existing institutions mediating natural resource policy at the district level;

Purpose-level OVI-1 has thus been met (*“Knowledge of institutions mediating policy [decentralised local government/agriculture and forest-related institutions] updated, identifying gaps and key constraints”*).

A strategy has been defined to re-orient rural policy to the interests of the small farmers, in line with OVI-2 (*“Research topics on strategies of participatory management aimed at enhancing the livelihoods of the poor and marginal at the FAI investigated and elaborated with a view to informing future FAI calls on Ghana and elsewhere”*). This is based on a critique of existing research strategies, their economic assumptions, and their technology-transfer orientation. Their tendency to subordinate participatory principles to external goals is likewise problematized. While the details of the proposed strategy are specific to the context of the Brong Ahafo, the principles on which it is founded are of wider relevance, and pertinent to conditions elsewhere in Ghana and beyond.

The strategy here presented acknowledges the social complexity of natural resource systems at the FAI in the Brong Ahafo, and the ease with which the interests of the poor and marginal (particularly women, and different classes of indigenes and migrants) can be marginalised within the policy process. The way forward must therefore involve a process of dialogue and negotiation, rather than technological prescription. A sceptical attitude is also required as regards the discourses which dominate the environmental fora at local, district and national levels, which are easily captured by those with power in society. Evidence needs to be placed in appropriate forms before all the resource users, to allow them to make their own demands on policy-makers. Supporting the development of institutions of local origin and under local ownership will be critical to this endeavour.

The District administration is an important node to create information systems. The District level is important since this represents one of the most important meeting grounds between administration and civil society, in which large numbers of actors involved in District administration and policy making are directly accountable to an electorate, and the electorate is mandated to participate in development planning and the formulation of development plans. This is the only forum at the local level with the legitimacy to arbitrate between resource claims, and reconcile competing interests. The producer institutions need therefore to be articulated with this level of democratic government, so as to establish their own voice in the policy process in a way which supports the functioning of democracy. OVI-3 (*“Uptake pathways for alternative policy and other innovations defined and assessed”*) relates to this interface between livelihoods and the democratic process.

Several donor programmes are working within the districts to improve the planning process, to make it more accountable and transparent, to integrate democratic formulation of plans at the local level with a more transparent process of allocation of funds to development projects within the district planning units (e.g. GTZ). Other programmes encourage networking among district personnel to integrate planning capacities of different agencies and lead to enhanced environmental planning (eg. DFID). The argument has been put forward that these initiatives would stand to benefit significantly from the development of the farmer platforms here proposed to help them achieve their stated goals.

Thus, the project aims to build upon these district-level initiatives, extending participatory district planning to natural resources management and creating an information system and multi-stakeholder fora which will influence the collection and analysis of data. The objective is to build a system of natural resource administration that is responsive to the needs of communities and different resource user interests.

8. Publications and Other Communication Materials

This was a one-year scoping study. The main intention was to design a full research project from which, *inter alia*, a series of research-action publications could be derived.

The immediate aim is to prepare *Working Papers* (ODI and IAS, Ghana), and an *ODI Natural Resource Perspectives* policy review. The four scientific annexes (attached) provide, however, a firm foundation for a more substantive study, of book length, and this will be included among the outputs of the full research project.

Outputs to date include:

- ❑ the four main annexes to this report
 - A Brief history of agriculture in the transition zone of Brong Ahafo
 - Cropping systems
 - Managing the environment
 - The way forward

- ❑ The internal reports:
 - Notes on Natural Resource Management Programme in the Transitional Zone of Ghana - by Kojo Amanor (11/2001)
 - 'Economic perspectives on land use, poverty and environmental issues in Ghana's forest transition zone (Brong Ahafo Region) - by Michael Richards (12/2001);

9. References Cited in the Report, sections 1-7

References are cited in the Annexes. A full bibliography is provided in Annex 4.

10. Project Logframe

The logframe for this scoping study is provided next. A draft logframe for the proposed follow-up project is given in Annex 5.

CN00/057: ‘Poverty dimensions of public governance and forest management in Ghana’ – Project Logframe

Narrative Summary	OVI	MOV	Risks & Assumptions
<p>Goal: [NRSP FAI LF Output 1] Planning strategies to sustain livelihoods of poor people dependent on forest adjacent to cropland developed and promoted</p>	<p>[NRSP FAI LF Output 1/OVI] By 2002, new approaches to the management of common pool resources and forest biodiversity validated in two target areas, incl. Ghana FAI.</p> <p>By 2003, these approaches incorporated into participatory management strategies to maintain forest integrity and adopted by target institutions in two targeted countries.</p>	<p>[NRSP FAI LF Output 1/MoV] Reviews by Programme Manager. Reports of research team and collaborating/target institutions. Appropriate dissemination outputs. Local, national and international statistical data.</p>	<p>[NRSP FAI LF Output 1/R&I] Enabling environment exists.</p> <p>Budgets and programmes of target instns. are sufficient & well managed.</p> <p>Target beneficiaries adopt and use strategies</p>
<p>Purpose: [NRSP FAI LF 1.2] Strategies for promoting new CPR management approaches to increase the livelihood opportunities of poor people developed and implemented in Ghana, in the FAI target zones.</p> <p>To be achieved through a phased approach involving:</p> <ul style="list-style-type: none"> ▪ Initial scoping study (present commissioned research) ▪ Full research study ▪ Validation of recommendations (in association with national and bilateral partners) ▪ Wider dissemination 	<p>[NRSP FAI LF 1.2.1.b] By end of project:</p> <p>Knowledge of institutions mediating policy (decentralised local govt./ agriculture and forest-related institutions) updated, identifying gaps and key constraints.</p> <p>Research topics on strategies of participatory management aimed at enhancing the livelihoods of the poor and marginal at the FAI investigated and elaborated with a view to informing future FAI calls on Ghana and elsewhere.</p> <p>Uptake pathways for alternative policy and other innovations defined and assessed</p>	<p>[NRSP FAI LF 1.2.1.b] NRSP research call (that uses findings of the project)</p> <p>Project FTR</p> <p>NRSP Annual Report</p>	<p>Incoming GoG retains commitment to ‘Vision 2020’ goals of broad participation, & proves open to policy innovation, & assimilation of research findings.</p> <p>Policy-makers are otherwise amenable to acknowledging evidence of research studies in developing policy.</p> <p>NRSP remains in a position to fund the full-scale research intended to follow this scoping study</p>

Outputs:	OVI:	MoV:	PAER
<p>1 Increased understanding of the social and institutional dimensions of natural resource management at the FAI in Ghana.</p> <p>2. Potential alternative strategies for developing and delivering appropriate participatory management approaches to benefit the poor identified.</p> <p>3. Increased awareness among NR researchers, policy- makers and development agencies of the types of changes which will be needed to ensure that current decentralisation and natural resource management policies contribute to poverty alleviation.</p>	<p>1.1 By end of the research Study, at least 3 research topics identified to take forward this research agenda, covering the areas of concern (social & instl/ policy/environmental)</p> <p>1.2 In each case: - elaboration of research hypotheses; - definition of a proposed research methodology (-ies); - identification of the key social and economic factors which are driving institutional and land use change; - refinement of a range of proposed indicators for assessing the social dimensions of land use; - Identification of possible sites for the full study, illustrating the interplay between ecological variation and social institutions on the livelihoods of the poor.</p> <p>2.1 NR researchers and policy makers engage with research agenda at workshop, and contribute to strategy formulation, identifying strengths and weaknesses of alternatives;</p> <p>3.1 Local capacity to carry forward the full research study, as evidenced by co-ownership of research proposals and publications; 3.2 Sensitisation of key public agencies in Ghana to research findings, through stakeholder workshops and focus group meetings; 3.3 Preliminary dissemination of research findings and ideas through the written media, national and local radio, NGO fora, etc. 3.4 Interest in, and demand for, project outputs among relevant publics, as evidenced by demand for project staff to present findings and participate in national and local planning.</p>	<p>Project reports 1.1 Review papers which scope out the main policy issues and challenges;</p> <p>2.1 Proceedings of Workshops, and participant assessments</p> <p>3.1 Contributions of partners to research report to NRSP, and to publications; at least one article for Ghanaian publication; research papers by research assistants. 3.2 Press cuttings and reports, briefings & external presentations; 3.3 Invitations to Project staff from external sources (in GoG, NGOs and elsewhere) to contribute to further policy development & public awareness.</p>	<p>1.1 High levels of situation specificity in environment, leading to low relevance of chosen study sites to wider picture in Ghana; 1.2 Obstacles to progress of decentralisation in study area, restricting access to relevant information and limiting applicability of findings;</p> <p>2.1 Unconducive policy environment in Ghana and/or UK</p>

Activities:	Milestones:	Budget:	Risks & Assumptions
<ol style="list-style-type: none"> 1. Set-up visit to Ghana by research leader 2. Initial methodology development workshop held (UK); 3. Literature Review prepared; 4. Research team formed and trained; 5. Inventory of stakeholders; 6. Institutional review of forest management at the FAI in Ghana; 7. Pilot sites selected; 8. Field research undertaken; 9. Economic scoping study undertaken, and findings fed into overall research study; 10. Supplementary field visits; 11. Stakeholder review meetings; 12. End of project workshop (Ghana); 13. Report and review paper drafted/ redrafted; 14. NRSP Report prepared; 15. ODI seminar to present findings. 	<ol style="list-style-type: none"> 1. Set-up visit in M1; 2. Initial methodology workshop M1; 3. Ghana field team selected by end M2; briefed and trained by end M3; 4. Institutional review by end M4; 5. Literature review by end M3; 6. Inventory of interested stakeholders by end M4; 7. Pilot study sites selected by end M4; 8. Case study research in period M4-M9; 9. Economic incentives scoping study by end M6; 10. Supplementary field visits undertaken by end M9; 11. Stakeholder workshops, M10; 12. End of project workshop, M11; 13. Publications, M12 & subsequently; 14. Report to NRSP, M12; revisions M13; 15. UK presentation of findings M13; 	<ol style="list-style-type: none"> a) UK staff costs £24,225 b) Overseas staff costs £19,850 c) Overheads £20,600 d) Capital Equipment £1,500 e) O/seas Travel £17,000 f) Miscellaneous £6,400 <p>Totals: FY 2001-2: £19,610 FY 2002-3: £69,965</p>	<ol style="list-style-type: none"> 1. Lack of cooperation at field level from local authorities, etc. 2. Policy makers and other decision makers have time available to meet researchers and participate in workshops, and are not suffering from workshop overload.
		Pre-condition:	Capable personnel are identified for the research assistant posts

11.Keywords

Ghana; natural resource policy; resource conflicts; local government decentralisation; migrants.

12. Annexes

Scientific Annexes:

- Annex 1: 'A brief history of agriculture in the transition zone of Brong Ahafo'
- Annex 2: 'Cropping Systems'
- Annex 3: 'Managing the Environment'
- Annex 4: 'The Way Forward'
- Annex 5: Draft logframe for the proposed follow-up project.

Administrative annexes:

- Annex 6: Final project inventory.

Annex 1: A brief history of agriculture in the transition zone of Brong Ahafo

Agriculture within the transition zone of Brong Ahafo has a long history. The area forms part of the zone of intensification and increasing sedentarism of the late stone age era in West and Central Africa, during the Second Millennium BC, broadly following the contours of the forest-savanna margin (Stahl 1993). This has given rise to what archaeologists term the 'Kintampo culture'. Within the transition zone a number of crops came to prominence in human production systems, which do not thrive under either undisturbed forest or savanna environments. These include the yam species, which essentially are vines which have adapted to several months of dry season. They require sunlight and also need tree supports on which to climb. The oil palm likewise requires moisture associated with tropical forests, but also sunlight, as well as fire which encourages the germination of seeds (Andah; 1993; Maley, 2002). These two species are likely to have come to prominence in the transition zone after long periods of experimentation, protection and selection, gradually leading to domestication. Over many years less bitter and more palatable varieties of yams with larger sizes will have been selected in processes which still continue today. These crops were probably harvested originally from the wild in disturbed sites or less thick woody areas. Agriculture then emerged through the management of the environment using techniques which were eventually to give rise to the methods of farm management now classified as "shifting cultivation" or "slash and burn".

A second agricultural complex developed in the drier grassland areas of the transition zone based on the cultivation of sorghum, millets and pulses, including cowpea and bambara beans. These species were important in supplementing yam, which could not be stored throughout the year.

A third complex developed in riverine and valley bottom areas, using flood retreat techniques and flood-tolerant crops such as *Oryza glaberrima* (African rice).

The cereal and pulse and flood retreat complexes provided important risk management insurance against the vagaries of climate and dry phases. Over the centuries there have been considerable shifts in climate and vegetation within the transition zone and forest zone, seeing retreats and advances of species associated with forest and savanna. The late holocene has been identified by palaeoclimatologists as a significant period of desiccation and forest retreat in which significant intensification of flood production technologies occurred. The late nineteenth and early twentieth century was characterised by a wet phase, which was followed by a dry phase around the 1950s (Nicholson, 1981; Maley, 2002; 1996; 1993). By managing a wide array of crop species and micro-environments which include species adapted to dry and wet conditions farmers developed forms of risk management and environmental management, which assured them highest long-term returns to their labour.

1.1 Phases of agricultural development

The increasing integration of West African into the world economy in the sixteenth and seventeenth centuries led to the introduction of new crops, particularly the new world crops - maize, cocoyams, and cassava - and the Asian plantain. Maize rapidly spread into the transition zone areas, complementing and displacing sorghum and millet species which now became the major crops in the drier savanna areas. Plantain and cocoyams became major moist forest crops. While cassava has become an important crop in transition and savanna areas, its spread outside the coastal areas has in many cases been a twentieth century phenomenon.

1.1.1 Colonial Agricultural Policy

Export crop productions of industrial staples became important in the early nineteenth century when palm oil became the major export. This was largely produced in the transition zone of south-east Ghana with easy accessibility to the ports. With the development of industrial oil palm plantations in southeast Asia, West African oil palm production became uncompetitive and was replaced by cocoa. By the 1920s the Gold Coast emerged as the major cocoa producer in the world and cocoa rapidly spread throughout the semi-deciduous forest belt. During the wet conditions of the late nineteenth and twentieth centuries its cultivation spread into areas which were not inherently suitable for cocoa cultivation. In the Brong Ahafo district cocoa cultivation spread into the Wenchi district as far north as Nchiraa. However, with drier conditions from the 1950s cocoa production became unviable, and with the opening up of Brong Ahafo as a food producing zone for the urban centres cocoa production declined as farmers converted to food crops.

During the colonial period food crop production was neglected. Agricultural policy mainly focussed on the cocoa sector. Only in the Northern Territories was there any focus on cropping technologies, with the Land Planning Areas which were initiated in the 1940s. These largely focussed on soil and water conservation technologies - terracing, manuring, and bans on bush burning. It was only in the post-war setting of the terminal colonial period that attention began to focus on agricultural development elsewhere. The context was agricultural modernisation and adoption of the new input technologies and mechanised implements - large scale mechanized farms using chemical inputs. The first agricultural modernisation project was the Gonja Agricultural Development project in the Northern Region.

1.1.2 Agricultural modernisation, input subsidisation and market liberalisation

In the independence period governments sought to promote the development of large-scale mechanised state farms. The northern transition area was an important zone of focus for state farms. The open vegetation enabled tractor ploughs to be more easily used than in the forest zone in which the dense root mat rapidly destroyed ploughs. The soils were suitable for cereal cultivation. The low population density of this area enabled large areas of land to be acquired by the state for agriculture without problems of expropriating large numbers of smallholder farmers who would have had difficulty gaining other land.

The Wenchi District became an important focus for state farms. In 1962, state farms were established in Wenchi and Branam on former Ministry of Agriculture experimental farms. At Wenchi, the main crops grown were maize, sorghum and yams with cattle. Between 250-300 acres of maize were cultivated. At Branam, 2000 acres were placed under maize, 700 under cotton, 200 acres under yam, and rice was also cultivated. Oil palms and teak were also planted at Wenchi but these were destroyed by bush fires.

The state farms were mechanised. Fertiliser application was low since the soil was recognised as fertile, the large acreages planted precluded intensive fertiliser application on the budget of the state farmers, and increased application of fertilisers did not prove to be cost intensive. On maize a rate of one bag of NPK per acre was applied and yields were around 5-7 bags per acre. The maize was not cultivated on a commercial basis but to get seed yam for planting. No fertilisation was used on sorghum and yields of 5 bags an acre were achieved. Mechanised field preparation was central to the state farms but was largely experimental.

At both state farms the land was stumped of its tree cover. At Wenchi, Massey Ferguson tractors were used. At Branam, Russian MTZ tractors and ploughs were used. The MTZ tractors proved to be poorly adapted to the local soils and were so heavy that they often got stuck. They also ploughed so deeply that they turned the undersoil over the top soil. Yams were also farmed under mechanised cultivation with ridges. This proved to be inappropriate and the yields were so bad that the state farms returned to hiring labour to prepare indigenous yam mounds. A major problem for yam cultivation was getting staking materials for the yams, since the tree cover on the state farms had been removed by mechanical land preparation. Labourers were sent to cut staking material from the surrounding bush. Without staking the yams provided very poor yields and insufficient staking material could be provided for large acreages of yams. Thus the area under yam cultivation declined.

Despite the production problems encountered by the state farms, tractor services and subsidised inputs were provided to communities surrounding the state farms, to encourage them to adopt modern agricultural technologies..

1.1.3 Market liberalisation and crisis of mechanised high input agriculture

With the adoption of structural adjustment, market liberalisation and removal of agricultural input subsidisation a large number of the state farms and mechanised agricultural projects have collapsed, even in their latest incarnation as private sector companies. Although the Branam State farms became the World Bank sponsored Ghana Livestock Company this company collapsed and has now been taken over as Alhaji Salia Farm. Many other large-scale commercial agricultural enterprises have collapsed in the Wenchi District including Damballa Farms, Dinchini Farm, Wenchi Farm, Akrobi Centronella Farms. A similar fate has also been experienced by other state and non-state agricultural projects, including the Catholic Church sponsored Subinso Agricultural Project, the Ofoman Agricultural Project, the National Reconstruction Corps Project at Kokoago, and the Subinja Irrigation project. A major problem facing all these projects has been generating viable agricultural strategies with the advent of privatised non-subsidised input markets.

The latest wave of medium and large-scale commercial farms are now establishing themselves as tree planting projects, mainly focussing on cashew production, with some teak. A major project is also being established by the government of Ghana, with the support of the World Bank and African Agricultural Bank, to establish a plantation project, with a major focus in the Brong Ahafo region. A national association of tree planters has also come into being.

While the state farms and their various mutations have failed to survive in the Brong Ahafo region, they have had considerable impact on the district, introducing new technologies, and creating a demand for ploughing services and input usage. The stumping of land and adoption of ploughing has also altered the soils in the district, and has created a problem where the destruction of topsoils has made many farmers to be dependent upon inputs. As one worker at the Wenchi State farm narrated “I came here in 1966. When I came most the land around was a forest area, so you could get a good yield without using fertilisers. Most of the farmers were not using the tractor in ploughing because they were not using fertilisers. Tractors came in on a big time around 1972. Now most of the farmers around are using tractors.”

The creation of an infrastructure of agricultural commercialisation and an improved road network to support this infrastructure also led to migration into the transition zone of Brong Ahafo. With the creation of the State Farms many migrants came from the Upper West Region in search of work. While many of these migrants failed to find public sector

agricultural work they were able to move into the agricultural sector as farmers. A pattern of farm migration began to establish itself supported by movement of seasonal migrant labourers. Youth from the Upper West Region would move into Brong Ahafo during the yam clearing season (from October onwards) working as daily and contract labour in farm clearance. They would move back northwards with the onset of the clearing season in the Upper West to prepare their farms in April.

This movement of migrant farmers and associated networks of mobile labour into Brong Ahafo, opened up another mode of agricultural intensification based on investments in labour. Two investment patterns thus opened up in Brong Ahafo in the 1970s-1980s:

- Intensification through investment in mechanical land clearance and subsidised inputs;
- Increased production through investment in hired labour, more extensive land clearance and more intensive weeding.

The mechanised-input strategy was more pronounced around areas of state farms and greater concentration of agricultural support services. The use of hired labour became more pronounced in the areas away from the agricultural support services. With removal of subsidised inputs, the main impetus now lies with intensification through hired labour. Many farmers formerly using subsidised inputs find purchase of inputs at market prices to be uneconomic, since the price of their production is undermined by the cost of production of low input farmers investing in labour.

1.1.4 Agricultural Research Infrastructure and agricultural information systems

The postwar developments in agricultural modernisation also led to the creation of a research infrastructure to promote the development and utilisation of new modern varieties and the use of inputs to increase yields per area of land. This is reflected in a number of crop research institutes within the state-supported CSIR (Centres for Scientific and Industrial Research) system or under the Ministry of Agriculture that are involved in adaptive research and the dissemination of improved crops through extension services. This research infrastructure for agricultural modernisation is essentially integrated into the international agricultural research and development centres organised around the CGIAR system. These centres have been organised within a conceptual framework of an international division in agricultural research. Basic research is seen as the province of the major industrial countries in the world. Applied research is carried out by international centres, developing new lines of technology designated as appropriate for farmers in developing countries. The major task of national research services within developing countries is to adapt and package these new designs for farmers within their domains, and work out recommendations which extension services carry to farmers.

As a result of this structure, national agricultural research services are highly dependent upon international centres for technology design, improved genetic resources and recommendation domains. With little funding for independent basic research, most research is concerned with attempting to adapt externally-generated technologies to Ghanaian conditions and institutionalising modern technologies within Ghana. While there have been notable successes in the creation of a national agricultural research technical infrastructure, there have been constraints on the research system. These result in a lack of empirical information on the existing characteristics and dynamics of farming systems.

The formal agricultural knowledge and information system is structured by a framework of modernisation in which the practices of farmers are presupposed to be culturally backward, and farmers are exhorted to adopt new methods. However, much of this rhetoric is drawn from received knowledge in international development rather than from local empirical data

and knowledge. Thus, ongoing research into farming systems tends to be structured by the concerns of donors and international research programmes rather than from a more dispassionate investigation of the actual dynamics within farming systems.

Research into farming systems tend to be structured within the larger international research programmes that commission the research, and tends to adopt the rhetoric and ideological positions of the parent programme, such as integrated pest management, low external input agriculture, “cosmovisions” or spiritual worldviews, organic agriculture, soil and water conservation, etc.. There is a notable lack of socio-economic research that examines ways in which farmers are responding to changing ecological, market and policy environments. In recent years participatory approaches have made some headway, including Participatory Rural Appraisal (PRA) approaches. However, this essentially involves farmers making inputs to the programmes of researchers and contributing to their conceptual framework. It does not challenge the perceptions of researchers of the small farmer sector, or lead to new knowledge on endogenous processes of change and adaptation within this sector. Research is predominantly structured by a technocentric focus rooted in systems dynamics, population pressures creating land pressures and the need to adopt new mechanised and chemical input technology or increasingly on new soil restoring technologies such as green manures, agroforestry and soil and water conservation. Little research examines farmers’ own innovatory technologies outside of this framework of international research; or the implications of the commodification of labour and emergence of large labour markets based on migrant labour for models of agricultural intensification based on labour-replacing technologies.

1.1.5 Environmental policy and information systems

The conjunction of factors - a dry period, from the 1950s, following a wet cycle in the earlier part of the twentieth century; concerns about global environmental change; and the traditions of colonial crisis narratives about shifting cultivation and unsustainable farming practices - has led in recent years to the proliferation of ‘crisis narratives’. These point to poor agricultural practices coupled with population growth resulting in increasing environmental and food security problems. However, these crisis narratives are rarely substantiated by empirical data on farming systems change or knowledge of the processes of change (Leach and Mearns, 1996). They also arise from international pressures to sign environmental treaties, and to implement policies that reflect these treaties.

Without a developed research capacity to undertake complex research into ecological processes and human ecology, nor a stable base of sufficient funding to support this process, received wisdom and ideological conceptions of the small-farmer peasant sector tend to influence policy decisions. These presume a cultural backwardness among small-farmers rooted in colonial conceptions and those of modernisation theory, and the need for small farmers to change their practices and become more receptive to modern technologies and the prescriptions of bureaucrats and other agents of change. While the failures of agricultural modernisation policies of the 1970s and 1980s and the collapse of the commercial food farm sector, should have promoted reflexivity, the recent rhetoric on environment acts as a diversion away from reflection. The policies of cultural modernisation are repeated, now within the environmental spheres. The practices of small farmers are now being seen as harmful to the environment and farmers are being exhorted to change their bad practices to protect the environment.

In contrast with policies of agricultural modernisation, these new environmental policies carry an added moral dimension, relating to the public good and the national heritage. This allows legislation to develop which can criminalize farming

practices, such as bush burning. It also allows alternative farming activities such as teak and cashew plantations to be presented as environmentally friendly activities to which donor and state funds can be diverted. These activities become the field of investment of large commercial farmers, who may gain soft loans and grants for environmental projects. Extensive tree plantations may however alienate considerable land from the small-farmer sector and lead to a new appropriation of land, which mirrors the land hoarding strategies of rich farmers who stumped large areas of lands during the 1970s to claim ownership of that land.

1.2 Population and migrations in Brong Ahafo

The population of Brong Ahafo is comparatively low. According to the 2000 Population Census Brong Ahafo has a population density of 46 people per sq. km, rising from 31 people per sq. km in 2000. This is the third lowest population density in Ghana. It compares with, say, 109 in the Eastern Region, and 130 people in Ashanti. Within Brong Ahafo, the greater concentration of population is in the southern forested districts, with the northern transition zones being more sparsely populated¹.

Table 1.2 Density of population by region in Ghana

Region	Area (Sq. Km)	Population density in 2000	Population Density in 1984
Northern	70384	26	17
Upper West	18476	31	24
Brong Ahafo	39557	46	31
Western	23921	77	52
Volta	20570	78	59
Upper East	8842	104	87
Eastern	19323	109	87
Ashanti	24389	131	86
Central	9826	161	116
Greater Accra	3245	897	441
All regions	238533	77	52

Source: Ghana Statistical Service (2000) 2000 Population and Housing Census: Provisional results.

The population of Brong Ahafo is ethnically diverse, consisting of Bono (Brong Akans), Bandas (Nafaana, Pantara, Ligbi) Mo (or Deg), Nkoran and other groups. There has also been a large influx of migrants from the Upper West and Upper East

¹The breakdown of population at the district and settlement level will be available later in 2002.

Regions, originally to the cocoa growing districts in Ahafo from the 1920s and from the 1960s to the northern transition zone for food production. Charcoal burning in the district has been largely organised by migrant Sisala charcoal burners from the Upper West.

1.2.1 Land Tenure

Two distinct tenure regimes are articulated in the Brong Ahafo region, which correspond to the ecology of the area.

In the *high forest areas* a family tenure system is articulated and in the parkland areas a more communal tenure system tends to predominate, particularly in the Mo and Banda areas. Within the high forest areas secondary forest fallows are invested in families and uncleared land is invested in chiefs and their stools. Citizens have rights to clear land within the domain of the chief they come under. Once forest land is cleared it tends to be maintained as family land, in recognition of the considerable labour involved in clearing mature forests in which many large hard-wooded trees are dominant (Wilks, 1977). Once land is brought into cultivation farmers tend to return to cultivate it periodically to prevent it from regenerating into mature forest. Soil recycling tend to be higher under secondary forest than under mature forest and secondary forest species may support richer soils than mature forests (Kellman, 1969; Nye and Greenland, 1960). Farmers move in a forward direction clearing new lands until those brought into cultivation earlier have regenerated well or until they meet other people clearing from other directions. Through this process of returning to secondary regenerated land which is easier to clear and possibly has better soil conditions than mature forest, clearly demarcated rights in land were recognised which could be transferred to descendants, resulting in the social creation of family land.

In the *parkland and savanna grassland areas*, a different set of conditions pertain. The woodland areas were not as difficult to clear as mature forests, although the undergrowth of grassy species created more problems than secondary forest shrubs. The thinner organic matter layer of the parkland environments, however, needed to be tilled and organic matter built up to gain good crop yields, leading to the labour intensive mounding techniques which developed. Farm land was also vulnerable to annual dry season bush fires. Under these conditions a store of invested labour in cleared fallow did not exist as in the high forest, and the main labour investment was not in transforming high forest into secondary bush but in tilling the soil. Since regeneration was also influenced by occurrence of bush fires, it made sense to select the best available regenerated land at time of clearing rather than focus on clearing land that had previously being cleared. Thus, in the past, farmers freely moved from area to area within the lands over which their settlement claimed ownership, clearing the most suitable regenerated land for making new yam farms.

In recent years a new set of factors have transformed the tenure system in these areas and this has resulted in the appropriation of land as individual and family land. This includes the following:

- the influx of migrants and build up of population leading to increasing land pressures. While land is still available there is growing competition for the best plots. Migrants require land on which to farm and the influx of migrant labourers allows farmers to extend the areas they cultivate through hire labour. Farmers maintain the plots they have under cultivation to assure that in future they will not have to travel far away from the settlement to gain land. This is achieved by maintaining a constant occupation of farm land, farming in one area and introducing shorter fallowing cycles. Children stake claim to the plots that their close relatives have established rather than going far to

open up new land. Gradually a family tenure system comes into being and it becomes difficult to find choice farming land through clearing uncultivated land.

- With the introduction of mechanised land tilling technology, farmers begin to make considerable investment in the land in the stumping of the tree cover to enable tractors to plough the land. They lay claims to ownership of these plots of land through constant cultivation of the plot and replacement of bush fallowing by permanent cultivation and soil nutrient cycling through application of inorganic fertilisers. Some farmers have also engage in land speculation by stumping large areas beyond their farming requirements.
- Permanent claims to ownership to the land are also established through the creation of tree plantations, such as teak and cashew. Many farmers become interested in these crops because it provides them with a secure means of holding on to the land and a cheap way of claiming permanent rights to land. Tree crops also take land out of the potential fallow recycling system, resulting in increasing experienced land shortage in land fallowing systems and pressures to secure rights in land through shorter fallow systems.

Land continues to be available throughout the parkland zone, but the introduction of mechanised cultivation and tree planting technologies creates pressures on land fallowing systems and leads to a scramble to appropriate individual and family farming plots. The major pressures on the land tenure system result from the implications of the introduction of new technologies rather than from population pressures.

1.2.2 Population and land tenure

The low density of population is reflected in land tenure systems. Unlike in some areas of the Eastern Region where over 50 percent of farm plots are contracted in sharecropping arrangements (Amanor and Kude-Dideretuah, 2001), only 6 percent of farmers in the sample contract land in this way. Only 2 percent of plots (of 816 plots on which data on tenure arrangements were made available) were cultivated on a sharecropping arrangement. Land hiring is also not very prevalent. Sharecropping is largely concentrated in the semi-deciduous forest settlement of Buoku, where 11 percent of all farm plots are cultivated on a sharecropping basis. Sharecropping is insignificant in the other settlements, and is very rare in the northern transition zone settlements. Land leasing is also not very common. Only 6 percent of farmers lease land. Unlike sharecropping, leasing is found in all ecological zones. However, it is mainly concentrated at Subinso, Kokoago and Buoko.

1.2.3 Main circuits through which land is acquired

Within the transition zone of Brong Ahafo the main circuits through which farmers gain access to land include the following:

- *Family land* refers to the land which families claim rights in through constant cultivation. This includes the right to pass on the land to descendants. These rights are established through constantly returning to cultivate the land after fallowing, and by constantly preserving or cultivating trees and crops which indicate that the area is not a wilderness.

- *Rights of spouses.* Women often farm on their husband's land, relinquishing rights to their own family land when they take up residence with their husband. However, in some cases a husband without land may work on land provided by the kin of a wife.
- *Clearance rights over community land,* are the rights of individual citizens to claim rights to land through clearing uncultivated bush which no one else is tending. If the farmer continues to maintain this area under farming practices while reproducing a family, the heirs will have rights to cultivate the land in the future as family land.
- *Use rights* refers to land given by one claiming ownership to the land through inheritance or clearance rights to another farmer for use. This relationship is usually established between people who are friends or have established a relationship based on reciprocal exchange of services or clientage. The conditions on which the land is loaned are usually based on an informal agreement between the land provider and the recipient. This varies from an annual presentation of some token crops at the discretion of the farmer, to a specified amount of crop (such as one bag of maize or groundnuts), or to the provision of some labour. The token presentation of crops reaffirms the ownership of the land, that the cultivator holds the land at the largesse of the owner. The main interest of the owner of the land in releasing the land to a tenant is to consolidate ownership rights over the land, and in preventing the land regenerate to the extent it may be considered uncultivated bush whose ownership may then be contested. Through releasing land to the land hungry to cultivate as a user right, the land owner can consolidate ownership over land areas beyond their immediate labour resources, while cementing social relationships of amity and clientship. The tenant is responsible for defending the land from encroachers by cultivating crops.
- *Rights given by chiefs.* Migrants without rights to clear land within a locality may approach the chief of that locality for land. This involves the prospective farmer making some presentation to the chief, which may include drink and livestock and some payment, and annually providing the chiefs with some token of thanks which may include cash payments and some food crops. In some cases these relationships have been transformed into formal renting of stool lands to migrants.
- *Hiring of land.* With growing scarcity of land and influx of migrants, leasing of land for monetary rents may appear. The land may be hired on an annual basis or for between two to three years, taking into account intercropping systems in which perennials form an important component.
- *Sharecropping* emerges with increasing scarcity of land. Sharecropping tends to predominate over land leasing only in the more sought after semi-deciduous forest lands. In grassland and parkland areas commercial transactions in land are expressed in land leasing arrangements, in which the rent is much lower than the sharecrop equivalent in forest land, although given the risk of cultivation in the northern transition zones, landlords might gain more stable income from monetary rents than share contracts. The most common sharecropping arrangements are the *abunu* system, in which the crops are divided into half shares between landlord and tenant and the *abusa* system in which the landlord takes one third of the crop and the tenant two thirds. The two systems may be intermixed with *abunu* for one crop and *abusa* for another crop grown in mixtures in the same field.

- Squatting*. Farmers may also gain access to land by squatting on land which has been alienated by government services. This includes government projects and agricultural agencies which have collapsed (such as State Farms and Ghana National Reconstruction Corpse), but also illegal occupation of forest reserves. This tends to suggest some form of land scarcity, or land scarcity of prime land (such as stumped and ploughed state farm land), since the rights to this land are insecure and subject to possible eviction or prosecution (as in forest reserves).

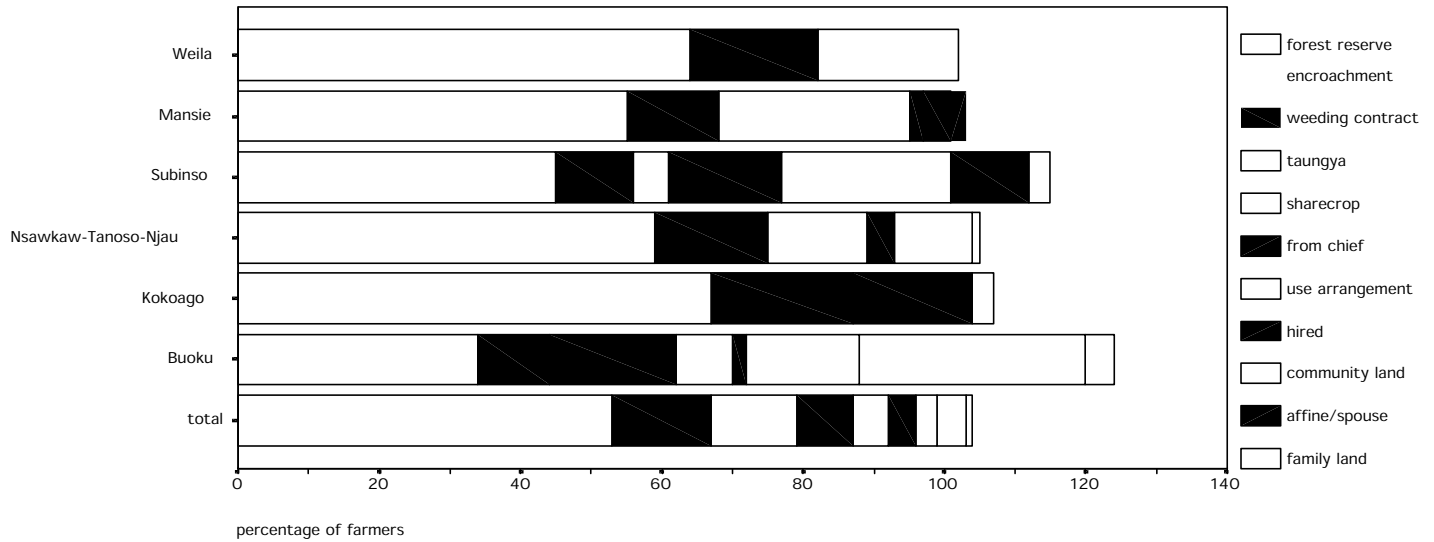


Figure 1.1 Tenure arrangements in the Brong Ahafo transition zone

Table 1.3 Sources of men's and women's land²

	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoku	
Male							
Family	71.4%	44.4%	42.2%	51.2%	52.9%	15.4%	46.2%
Community clearance rights	28.6%	48.1%	6.7%	16.3%			16.7%
Spouse or in-laws			2.2%	4.7%	5.9%	7.7%	3.2%
Use			13.3%	11.6%		3.8%	6.5%
From chief			13.3%			3.8%	3.8%
Hiring			6.7%	4.7%	23.5%	15.4%	7.0%
Sharecropping			2.2%			7.7%	1.6%
Taungya						11.5%	1.6%
forest reserve encroachment						3.8%	.5%
Family & use			4.4%		5.9%		1.6%
Family & hiring				2.3%	5.9%		1.1%
hire & use			8.9%				2.2%
Use & sharecrop						3.8%	.5%
Weeding contract		3.7%					.5%
Community and family		3.7%		4.7%			1.6%
Government agency and family land				2.3%	5.9%		1.1%
Family and purchased ³				2.3%			.5%
Family and taungya						15.4%	2.2%
Taungya & sharecropping						7.7%	1.1%
Community and hire						3.8%	.5%
Women							
Family	50.0%	61.5%	31.4%	52.6%	58.3%	32.0%	46.9%
Community clearance rights	4.5%		2.9%	5.3%			2.8%
Spouse or in-laws	40.9%	26.9%	20.0%	24.6%	33.3%	12.0%	24.9%
Use			14.3%	10.5%			6.2%
from chief gift		7.7%	8.6%				2.8%

² This table shows the various circuits through which farmers gain land, since the total land at their disposal may result from using different circuits. Thus land shortage may show up as an absolute shortage of family land resulting in new types of land relationships replacing family land. On the other hand shortage may be reflected as the ability to gain sufficient land through one circuit, leading to individual farmers aggregating their land through different circuits, in which sharecropping may supplement family land with sharecropping. Land scarcity appears only to be significant at Buoku where both men and women access land through a wide variety of circuits and also depend upon gaining sufficient land through accessing multiple sources of land (hiring, family taungya, sharecropping and squatting).

³The purchased land is a building plot purchased in town, subsequently used for farming

Hiring	3.8%	5.7%	1.8%	12.0%	4.0%
Sharecropping		2.9%	1.8%	8.0%	2.3%
Taungya				20.0%	2.8%
forest reserve encroachment				4.0%	.6%
Family & use		2.9%		4.0%	1.1%
Family & hiring		5.7%			1.1%
Hire & use		2.9%			.6%
in-laws & hire		2.9%			.6%
Community and family	4.5%		3.5%		1.7%
Family and in-laws				8.3%	.6%
use & taungya				4.0%	.6%
Taungya & sharecropping				4.0%	.6%

The main form of access to land for the majority of farmers in the Brong Ahafo transition zone is through the allocation of family land by close kin (see table 1.3 and figure 1.1) Around 50 percent of farmers in all zones gain land through family relations. In the northern transition zone settlements, farmers can also gain access to uncultivated community/stool land. As long as they are citizens of the settlement that claims ownership of the land, they can cultivate any land that is not being utilised by other farmers in cropping-fallowing cycles. Twenty percent of farmers have access to community land. However, community land is more prevalent in the northern settlements, such as Weila, and Mansie (where over 20 percent of farmers have land they acquired by clearing uncultivated bush). Gaining rights to land through clearing of uncultivated bush is also fairly common at Nsawkaw, but less common at Subinso. But this perhaps, reflects the large number of migrants in the survey at Subinso who cannot claim ownership of land through cultivation without first approaching chiefs and making some kind of payment. In the semi-deciduous zone settlements there is little unclaimed and uncultivated land in the bush and few farmers claimed they gained rights to land through clearing uncultivated land.

A significant number of women also get land through their spouse or affines (relations of spouse). Fourteen percent of the sample gain land from their affines. However, this varies considerably between settlements. In land abundant Weila, 40 percent of women depend upon their spouses for land while in land scarce Buoku, only 12 percent of women depend upon their spouse for land. More men gain access to family land at Weila than at Buoku, but more women at Buoku gain access to family land. However, the Buoku sample is complicated by the fact that the population largely consists of a variety of migrants who have settled in the area from the 1920s on land they gained from the Wenchi chief. This includes the descendants of migrant cocoa farmers from Ahafo and of northern migrant labourers. In a situation of land scarcity and competition for land among migrants, most young men do not rely on lands acquired by their families, but gain land through hiring, sharecropping, getting forest taungya land⁴, and illegally encroaching within the forest reserve. Women may be forced to farm on land acquired by their families, since men get preferential access to hired, sharecropped and taungya land. This is

⁴A forest tenure contract in which forestry department release forest reserve land to farmers for a few years (frequently between three to five) in which the farmers undertake to plant and nurture timber tree crops and grow food crops within the plantation.

reflected in the larger acreages that men farm. As in all the other settlements men still farm significantly larger areas than women. At Buoku the average acreage women had under crop was 3.75 acres (Std 2.737) as compared to 8.75 (Std14.55) for men - but with considerable variation between different types of men (See Figure 1.3)⁵. In land scarce areas, young men may seek to gain access to land through circuits other than the family. This also has implications for the family as a farming unit and suggests the emergence of more individual based farming strategies (Amanor, 2000).

⁵Caution is needed in presenting mean areas cultivated, since this is distorted by a few farmers with much larger lands, and a tendency for some of the rich to exaggerate their wealth and the extent of their farms to reaffirm their importance.

Figure 1.2 Extent of cultivation

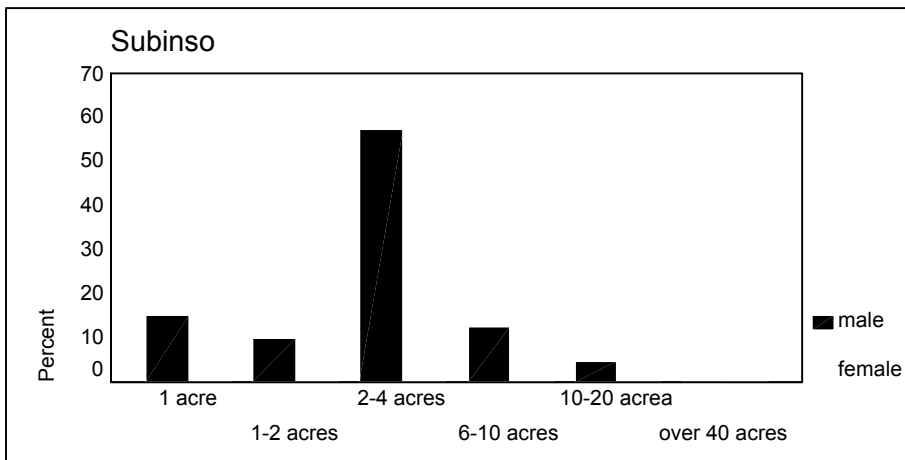
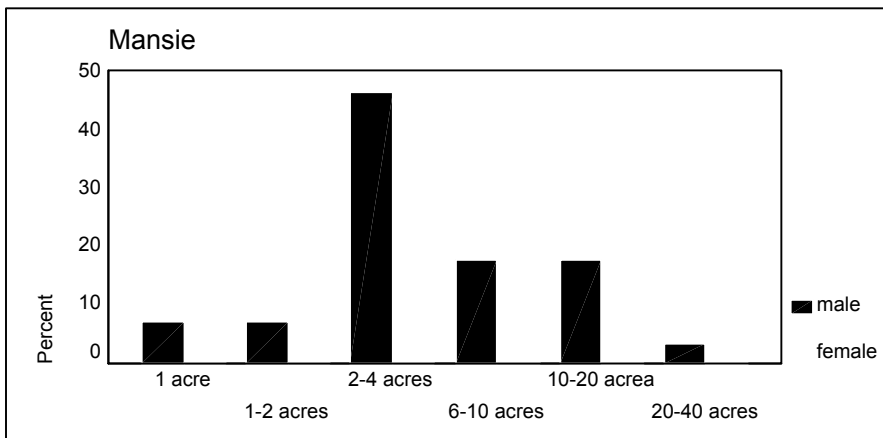
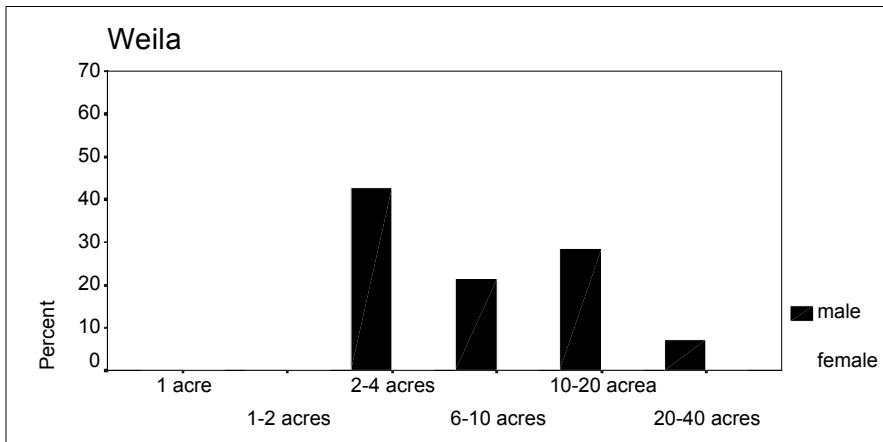
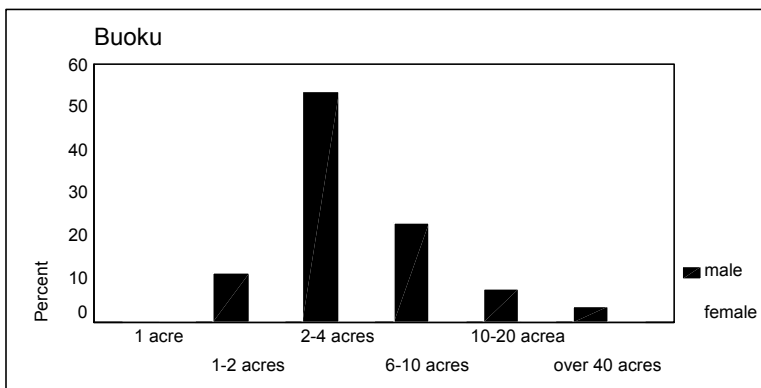
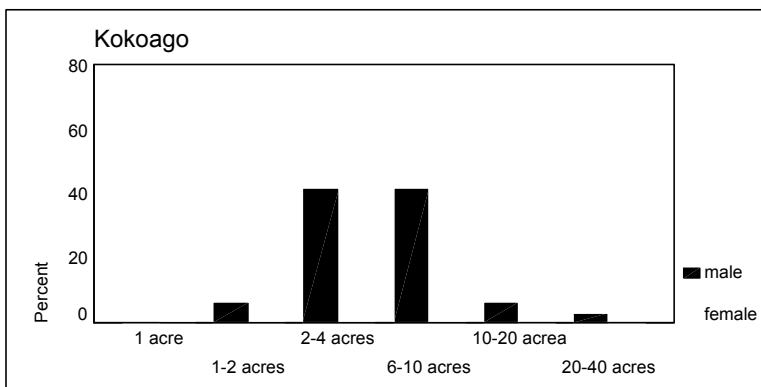
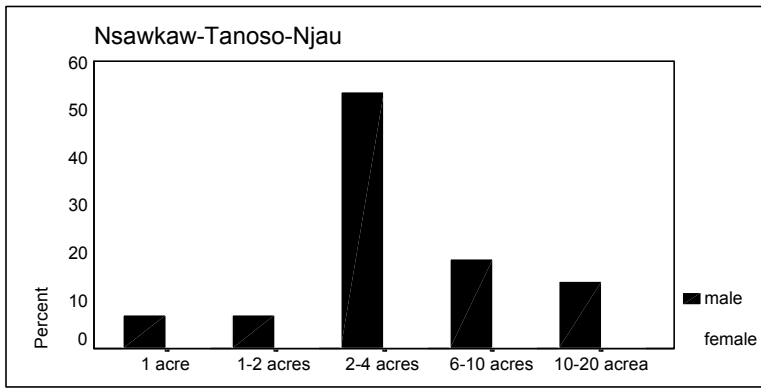


Figure 1.2 (continued)



The dependence of women on their spouses for land does not reflect shortage of land but rather, access to labour. In the northern transition zone men historically opened up the land for cultivation, clearing and organising labour to clear their land. Yam was the major crop cultivated. After harvesting their fields they would move onto new land and their wives would take over their farm planting, groundnuts and vegetable intercrops on the land. The major constraint on farming in these areas was not shortage of land, but the labour demands of breaking the soil, clearing the numerous small trees and grassy species, and tilling the soil into mounds. These were difficult tasks for women to organise. It was also difficult for women to get men to clear farms for them in addition to making their own farms. Thus wives focused on taking over the abandoned yam farms of their husbands and on crops which could thrive on soils which had already supported heavy feeding yams. Under these constraints women specialised in groundnut cultivation. This is the pattern which continues to exist at Weila, where groundnuts predominate among women and women farm on their husband's plots. These constraints are not so marked in the dry semi-deciduous areas. Once mature forest has been transformed into secondary forest in which small, fast-growing softwood pioneer species are dominant, the labour demands of bring the soil under cultivation are not daunting. It is easier for women to get their husband's and male relatives to clear land for them or to hire labour, or to carry out their own clearing. Forest soils respond well to minimal till cultivation and do not require the labour intensive mounding and ridging techniques of their parkland counterparts.

With the increasing commodification of agriculture and the influx of migrants, these conditions may be transformed. Increasing integration into markets and growing demands for a variety of food crops transform many previously domestic crops into cash crops. Men may (if prices improve) choose to grow their own groundnut crops or continue to cultivate their old yam fields with groundnuts. Alternatively, they may chose to grow other crops, including long-duration perennials such as cassava (which can provide a standing crop for up to three years). This may lead them to hand on only a portion of their old yam plots to women. With insufficient land from their husbands to meet their own needs, women may search for alternative land. The influx of migrants provides them with new avenues for clearing land and gaining access to their own land and to family land. They can also invest in labour to cultivate a wider range of cash crops, including maize and vegetables. This could result in the pattern more prevalent at Mansie, Nsawkaw, and, to some extent Subinso, where more women have access to family land and are less dependent upon their spouse.

The vagaries of climate may also produce a similar tendency. Increasing risk of crop failure is likely to result in crop diversification. Men might cultivate cassava, pulses, cereals and new root crops and vegetables in addition to yams, and women could also cultivate cassava and cereals, in addition to groundnuts and vegetables. The traditional division of labour, land management practices, and crops would become disrupted as complex long-duration intercropping and mixed cropping strategies are elaborated.

Similar dynamics may operate in the complex interactions between access to land, labour and adaptive crop management at Buoku in the semi-deciduous forest. While women have access to family land, all the women farming on family land grow groundnuts, usually intercropped with cassava. Women may be farming more depleted family lands, which will not support maize, which is the preferred crop of men. Men may seek better lands outside the family to grow maize, and women may adapt their crops to meet the lower fertility of the land. Men may also choose to invest in cash crop production outside of family lands in order to prevent other family members making demands upon them over the access they have got to large areas of family land.

User rights in land become circuits in settlements with large inflows of migrants. Six percent of farmers in the survey were dependent upon user rights alone to get access to land. A further two percent of the sample gained part of the land on which they farmed from a friend, as a user right. User rights are common at both Subinso and Nsawkaw. Fourteen percent of farmers at Subinso were dependent upon user rights to gain access to land and a further 4 percent gained part of their land through negotiating for user rights. At Nsawkaw, 11 percent of farmers gained all their land through user rights. User rights occur to a lesser degree at Buoku, where 2 percent of farmers were dependent upon user rights for farm land and a further 6 percent of farmers gained part of their land through negotiating for user rights. User rights frequently reflect a relationship between a migrant and an indigene. At Subinso, 86 percent of those who gained access to land on a user arrangement were migrants, and at Nsawkaw 64 percent. User rights reflects a situation where land is becoming scarcer but where the commodity price for hiring of land is not very high. With increasing scarcity of land the landowner is anxious to protect their rights in land by ensuring that it is kept in cultivation and that this ownership of the land is not challenged by others. The preferred users are usually migrants, since their lack of rights in land ensures that they are unlikely to challenge the existing ownership claims. User rights are more common in the parkland environments, where cropping systems have tended to be based around annuals, not tree crops.

In areas where land is abundant, migrants can frequently gain land from chiefs by giving them yearly token payments - “drink money” as well as some crops usually at the time of the harvest festival. These are token fees that do not reflect an economic rent value. As land becomes scarcer and competition for land greater, migrants increasingly have to lease land or pay annual fees to the chiefs who claim ownership of the land. Thus with the movement of migrants from Domaa into the Buoku area in the 1930s and 1940s the Wenchi chief began to organise an administrative system for collecting revenues from the land. An *abusahene* was appointed to collect rents from the farmers, originally a third share (*abusa*) of the cocoa crop. With the coming into power of the Convention People’s Party at independence, traditional councils were banned from collecting a third of the crop as rent, and rents were paid as fixed annual payments, which were regulated by the Administrator of Stool Lands. Nowadays, the Wenchi Traditional Council issues annual land permits to farmers which are collected at the time of the annual yam festival. In 2001 the nominal value of this “customary drink” was set at ₵40,000 per farmer (about \$6 or the equivalent of a quarter bag of maize), although some farmers with larger farms paid over ₵100,000. Ten percent of the value of these rents is claimed by the Administrator of Stool Lands.

With growing scarcity of land and increasing commercial potential, leasing of land may become an important way for migrants to gain access to land. In the survey 17 percent of migrants gained access to land through land leases as compared to none of the citizens. Land leasing is mainly concentrated in Kokoago and Subinso, in settlements which have had pronounced commercial agricultural sectors. In both settlements, hiring of land tends to be focussed most on maize farms, but at Subinso land is also hired for groundnuts. At Subinso, over 34 percent of hired plots are under maize and maize intercrops and a further 32 percent under groundnuts. At Subinso there is a relationship between hired plots and plots which have been stumped. Sixty percent of hired plots at Subinso are stumped as compared to 12 percent of plots in which cultivators have gained user rights. This relationship is evident in some of the statements of farmers on how they acquired land:

- “I hired the ploughed land and made an appeal for the yam and maize land to be released to me for free”
- “I begged for the yam and cassava land and hired the stumped land for groundnut cultivation”.

Land hirers are prepared to pay a premium to obtain stumped land for commercial crop production of groundnuts and maize, instead of seeking to acquire user rights on non-stumped land. Landowners are able to charge a premium for stumped land on account of the labour invested. However, cultivators would only pay this premium where they are interested in growing crops which would benefit from the use of the plough. Hiring stumped land for yam cultivation, for instance, would not be rational. A number of other economic and agronomic considerations may also influence the emergence of land hiring arrangements in other sectors. Migrants may choose to hire land close to the town if they fail to gain land from other local farmers on a user-right basis, and if the alternative of seeking land from the chief involves travelling far distances away from the settlement.

At Kokoago the majority of hired plots are under maize cultivation. 18 percent of hired plots are under maize, 18 percent are under maize-cassava intercrops, 6 percent are under yam-cassava-maize intercrops and another 6 percent under other maize intercrops. Other significant crops grown on hired land include cowpea (18 percent), tomato monocrops (12 percent) and cassava monocrops (6 percent). The land is frequently hired for periods of three years to allow for intensive crop rotations. This maximises returns from investments in hired land and labour. Often, maize follows tomatoes and is followed by cowpea. Only 14 percent of hired lands are lands that have been stumped. Sixty-eight percent of stumped lands are under cropping systems with a maize component (36 percent under maize monocrops, 20 percent over cassava- maize intercrops, and 12 percent under other mixtures including maize). But 64 percent of stumped lands are cultivated by families for their own benefit. This indicates a reluctance to release stumped lands for hire.

With greater land shortage in high value forest locations, sharecropping grows in popularity displacing monetary land leases and user rights in land. At Buoku 12 percent of plots are allocated on a sharecrop basis, 11 percent on land leasing, 7 percent as user rights and 2 percent by the chief. Thirty-three percent of farm plots are on family land. At Buoku sharecropping and land leasing are the preserve of migrants. None of the locals sharecrop. However, migrants are also important land owners, 58 percent of family lands are owned by migrants. The incidence of sharecropping and its centrality to the agrarian economy is low compared to some settlements within the Eastern Region where a large proportion of citizens gain access to land through sharecropping (Amanor with Kude Dideretuah 2001). The dominant sharecropping relations are *abusa* (one share to the landlord, two shares to the tenant) which accounts for about 41% of the incidence of sharecropping, variants of *abunu* (a half share of the crop or area under cultivation between landlord and tenant in 41 percent of the incidence of sharecropping), *abusa* for one crop and *abunu* for another, and four shares of which the tenant takes three (*abunain*).

Increased shortage of land is reflected at Buoku by a large number of farmers gaining access to land through *taungya* and illegally encroaching into the forest reserve. However, underlying this are complex socio-political relations between the Forestry Department and farmers. An artificial land shortage was created among farmers near the forestry boundary when the forest reserve was demarcated and gazetted. Insufficient lands were allocated for fallow management strategies and population growth. Relations of clientage have also been encouraged, with the Forestry Department releasing highly fertile forest land to farmers for cultivation in return for free labour in plantation development, and in order to promote social forestry and community forestry programmes.

1.2.4 Migrants' Access to Land

The relatively low population density of the Brong Ahafo region and the high labour costs of establishing farms based on tilling and mounding techniques, result in relatively low rental values for land and easy access. This is particularly the case in the forest-savanna woodland mosaics, outside of the high potential cocoa lands. The movement of migrant farmers and farm labour into the transition zone of Brong Ahafo has provided a major impetus to opening up the zone, and has provided the hired labour to enable local farmers to expand into commercial food crop cultivation. The value of this labour is higher than the scarcity value of land. Therefore farming communities and chiefs have attempted to attract migrant labour into the area by providing cheap land to migrant farmers who have the capacity to organise and draw in migrant labour networks. Hence user rights in land are a prominent land relationship between local landlords and migrant tenants, and frequently reflect patron-client relations organised around labour services.

In many instances these relationships have served migrant farmers well. However, the prominent role accorded chiefs by the colonial and post-colonial state, as custodians of land, customary relations and tradition, and the lack of checks and balances on them, has enabled chiefs to use the land insecurity of migrant tenants to impose their will over tenants. This has subjected them to forms of service and clientage that are arguably inappropriate to modern notions of democracy, governance and civil society participation.

The downside of these forms of 'customary land administration' was apparent at Atuna, a settlement of migrant Dagaaba farmers from the Upper West Region, on the stool lands of Jensonso. Farmers at this settlement said that before the last general election, the chief came around and demanded that they vote for the NPP party. However, they exercised their democratic right to vote for the National Democratic Congress (NDC). Following the success of the NPP party, the Jensonso chief vowed to eject the migrant farmers from Atuna. Since the election they have been harassed. The chief has issued an edict banning the farmers from selling firewood or making charcoal on their land. The Atuna farmers claim that he has also brought chainsaw operators and charcoal burners to cut down a large number of trees on the land and then blames the farmers for the ensuing degradation of the environment. According to the Jensonso chief, the farmers at Atuna are spoiling the environment and changing the land into a savanna through excessive cutting of trees. Hence he has found it necessary to intervene to protect the environment. The farmers deny this and say that they are not destroying the environment but rather preserving many trees. They argue that although the land originally contained forest and supported cocoa, by the time they came to settle at Atuna, all the original cocoa farmers from Ashanti had gone. The land had been transformed by bushfires into grassland. The new migrants say they have been preserving trees as they farm, as a result of which many small trees are now regenerating on the land. As they farm, the women gather the deadwood from the cleared plots as fuelwood. Small quantities of charcoal are also made during the farm clearing season, and this provides them with an important supplementary income source.

1.3 Natural resource tenure

Access to natural resources other than the soil is controlled by chiefs, in whom the 'allodial rights' are vested. Starting from the colonial period, a legal framework for customary land tenure has been created in which farmers only have usufructary rights. In the early colonial phase, this was interpreted to mean that chiefs had rights to a portion of revenues generated by the exploitation of natural resources such as timber and gold production, as well as the right to make bye-laws defining the

exploitation of resources, and rights to alienate land for the creation of forest reserves. With the development of an export timber industry and the concession system, starting in the 1940s, this has been interpreted to mean that chiefs have rights to all natural resources as well as control over the issue of permits and concessions for exploitation. Thus, the exploitation of natural resources preserved by farmers on their own land has effectively been criminalized, particularly when a permit or concession has been allocated to another party. The 1962 Concessions Act vested all trees in Ghana in the office of the President to administer on behalf of chiefs. This has given the Forestry Department the power to control the use of all trees on reserves and farmland. The timber industry has the right to exploit timber produced on farmland without making any payments to the farmer. Royalties are only paid to the chiefs in whose domain the timber was felled and to the local district authorities.

The access of farmers to fallow and farmland trees for livelihood purposes has gradually been eroded. At one time, there was a clear demarcation between timber species which local producers had rights to utilise for the domestic market ('odum' and 'wawa') and those produced for the export trade by concessionaires (mainly redwoods, mahogany and cedar). However, with a growing focus on export-led growth, increasing scarcity of timber, and diversification of exports, the domestic timber species have been monopolised by timber concessionaires producing for export. The majority of export timber now originates from off-reserve concessions on farmlands. The ban on chainsawn lumber criminalizes the small-scale timber sector and puts the production of timber for the domestic market in the hands of concessionaires and sawmills. This ban has been implemented without creating the necessary mechanisms to ensure that domestic supplies of timber can be met by the sawmills. As a result, chainsawn timber still dominates the domestic market. It is now produced illegally, mostly by well-organised urban businessmen who can evade custom checkpoints and make all the necessary payments en route to the main urban markets.

Chainsaws are not only used for processing lumber but also play an important part in several forest products, such as mortars, canoe carving, other wood-carving crafts, fuelwood, etc. The wording of the legislation governing the ban on charcoal production is sufficiently vague to also effect these other sectors, where producers encounter problems of getting legal access to trees, getting access to chainsaw operators to process trees or logs, and being able to transport their products easily along major transport routes without being reprimanded by police and custom officials.

As a result of these problems, natural resource livelihood options in the Brong Ahafo region have increasingly focussed on charcoal production, which depends on utilising trees other than the main timber species. However, production within this sector is also affected by the struggles of district authorities to gain control over the resource, as well as by an environmental lobby which blames charcoal producers for serious land degradation, even desertification.

In the early 1990s, the promotion of NTFPs formed a central part of the DFID (ODA) Collaborative Forest Management Programme in the Forestry Department. However, the problems inherent in the framework of natural resource tenure were not addressed by this project, which focussed on rights to domestic usage of small quantities of NTFPs from forest reserves and farmland, and not utilisation for livelihoods, and on the production of a narrow range of NTFPs in community nurseries.

1.4 Supplementary livelihoods

Around 50 percent of the sample farmers had supplementary off-farm incomes, including 46 percent of men and 56 percent of women. The main off-farm incomes for men come from natural resources (eg. charcoal, crafts), artisan activities, and petty trading. For women the main off-farm incomes consist of petty trading and preparation of cooked food. Migrant Dagaaba women also brew sorghum beer (*pito*), and this leads to increased demand for sorghum in the agricultural economy. Petty-trading and preparation of cooked foods are more important in market towns, such as Subinso or Nsawkaw. The main artisan activity carried out by men is tailoring. This accounts for 5 percent of male off-farm incomes. Others include bicycle repair, masonry, blacksmithing, aluminium pot manufacture, and radio repair.

For women the main artisan activity is dressmaking. While many male off-farm incomes are dependent upon natural resource exploitation, outside the production of charcoal, very few farmers have developed other viable source of income. Women's access to natural resource exploitation is extremely limited, and virtually confined to charcoal production and selling. Widespread participation in charcoal production is limited to a handful of settlements in which the techniques of charcoal production exist, and where the necessary infrastructure to support a viable trade has been created (eg. Weila and Mansie). At Nsawkaw, charcoal is largely produced by specialised migrant charcoal burners.

This lack of development of crafts based on natural resource utilisation is mirrored by a marked lack of development support from externally funded government and donor projects for natural resource development. It is also reflected in a hostile policy environment, which creates a framework for natural resources tenure that excludes farmers, legislation that criminalizes their utilisation of tree resources, and environmental policies which view off-farm incomes based on natural resources as a cause of environmental degradation. This lack of development of a popular craft-based natural resource sector, is in marked contrast to the importance of forest resources in national export trade, and reflects the appropriation of forest resources for export trade and the influence of industrial concession-holders, at the expense of small rural producers.

Table 1.4 Main off-farm incomes

Percentage of farmers engaged in off-farm activities	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoku	Total
Men							
Off-farm incomes	43	50	51	48	39	46	46
Natural resource exploitation	18	43	11	10	6	4	15
charcoal	11	39	4	5	.	.	9
Hunting	3.5	4	.	.	.	4	1.5
Herbalist	.	.	2	5	.	.	1.5
Carpenter	.	.	.	.	3	.	0.5

Pestle-carving	.	.	2	.	.	.	0.5
Mortar-carving	3.5	.	.	.	.	.	0.5
Hoe-handle making	.	.	2	.	.	.	0.5
Palm-wine tapping	.	.	.	.	0.3	.	0.5
Petty-trading	11	4	9	5	10	12	8
Artisan	10	.	20	16	16	.	11
Casual labourer	.	,	,	7	.	.	1.5
Women							
Off-farm incomes	54	57	80	40	59	56	56
Natural resource exploitation	.	12	3	2	.	.	3
Charcoal	.	12	3	2	.	.	3
Petty trading	41	19	37	19	32	32	31
Prepared food	14	15	23	7	23	8	14
Pito brewing	.	4	11	2	.	8	4

Annex 2: Cropping systems

2.1 Cropping profiles in the districts

Cropping systems in the transition zone of Brong Ahafo are complex and diverse. In the survey of 6 settlements, 818 farm plots and 389 farmers, over 150 different cropping combinations were found. The dominant crops cultivated include yam, cassava, maize groundnut, sorghum, plantain cocoyam, bambara beans, cowpea, tomato, okro, pepper, and garden egg. Small quantities of rice are cultivated in valley bottoms. The dominant tree crop cultivated is cashew with some farmers also investing in teak plantations.

Cassava is the most commonly cultivated crop. It is cultivated by 76 percent of surveyed farmers on 45 percent of farm plots. It is a prominent crop in both northern parkland environments and southern deciduous forest areas. Yam is also very important and is cultivated by 71 percent of farmers on 36 percent of plots. Yams tend to be more important in the northern parkland environments than in the southern semi-deciduous forest. Maize is the third most important crop, and is grown by 60 percent of farmers on 35 percent of plots. Maize is important in both parkland environments and the southern deciduous forests, but is more prominent in the southern high forest fringe areas. Groundnut is the fourth most important crop, which is grown by 48 percent of farmers on 24 percent of plots. While groundnut is normally a savanna crop it has acquired importance in some of the high forest fringe communities. Groundnut is also a crop in which women specialise. Seventy percent of women in the sample cultivate groundnuts as compared to only 29 percent of men. Fewer women cultivate yams, cassava and maize than men.

Intercropping is more common than monocropping in the transition zone, with 62 percent of farm plots in the sample being grown intercropped, as compared to 38 percent monocropped. It is only at Kokoago that (among men) monocropping prevails over intercropping. The predominance of monocropping is indicative of the commercial orientation of farming. High rates of monocropping indicate market specialisation and a focus on maximising commercial yields of a narrow crop range. Intercropping is more associated with risk management strategies that attempt to hedge against the vagaries of markets, rainfall and pest attack. Monocropping is frequently associated with use of high inputs. Maize is frequently cultivated as a monocrop using inorganic fertiliser and tractor ploughing. However, groundnut is also an important monocrop, which is cultivated without the use of fertilisers. At Kokoago the high rates of monocropping reflect the adoption of high-input farming techniques.

Figure 2.1 Main crops grown in the Brong Ahafo transition zone

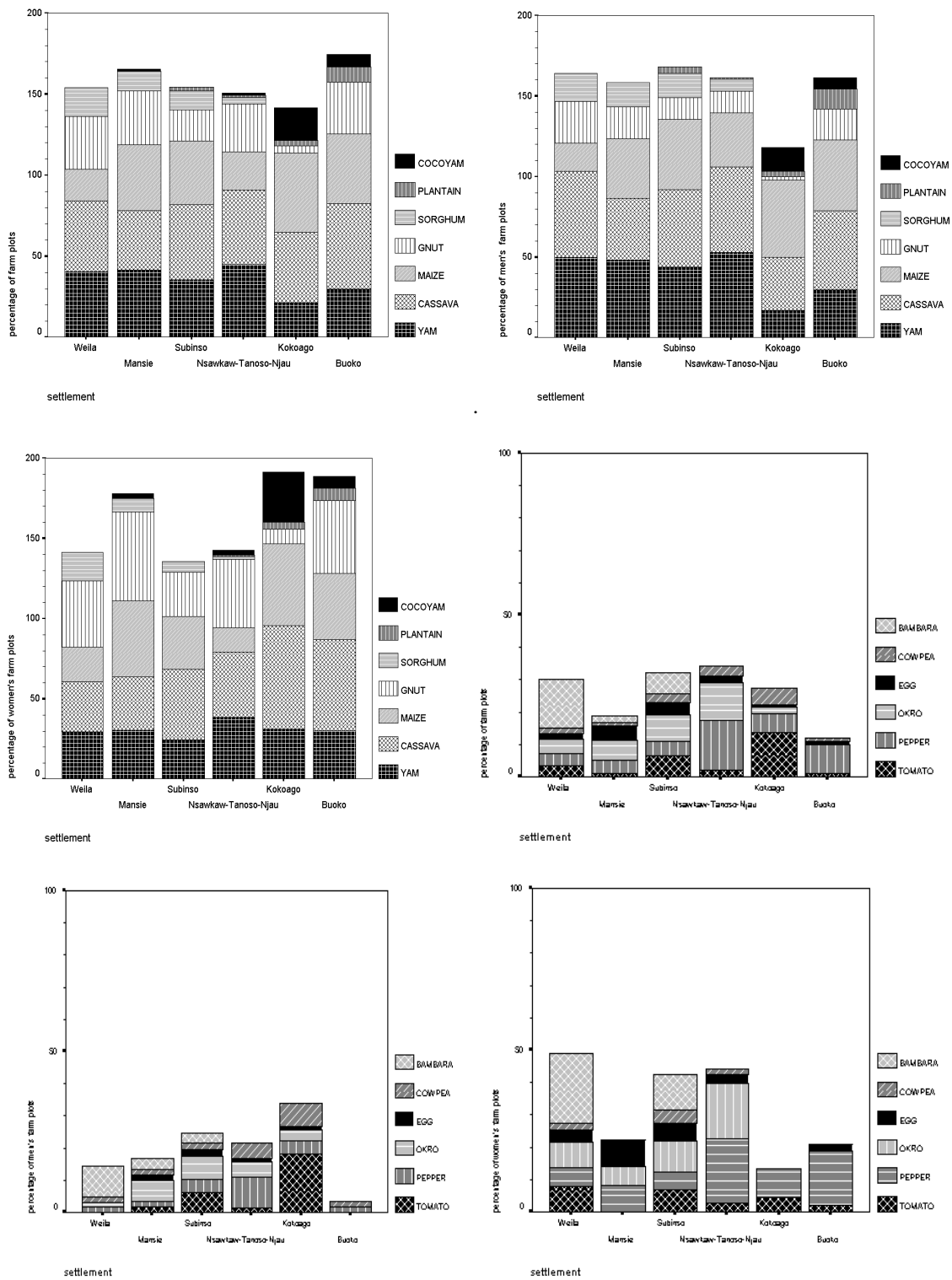


Table 2.1 Distribution of crops in men's and women's farm plots

Crop	Sex of Cultivator of plots	Percentage of plots under different crops						
		Weila	Mansie	Subinso	Nsawkaw-Tanoson-Njau	Kokoago	Buoko	Total
Yam	Male	50	48	44	53	17	30	40
	Female	29	31	25	39	31	30	32
	All	41	42	36	45	22	30	36
Cassava	Male	53	38	48	53	33	49	45
	Female	31	33	44	41	66	57	44
	All	43	36	46	46	43	53	45
Maize	Male	18	37	44	34	48	44	38
	Female	22	47	33	15	51	41	31
	All	19	41	39	23	49	43	35
Groundnut	Male	26	20	13	13	2	19	14
	Female	41	56	27	42	9	45	37
	All	33	33	19	30	4	32	24
Sorghum	Male	18	15	15	7	0	0	9
	Female	18	8	7	2	0	0	5
	All	18	12	12	4	0	0	7
Rice	Male	0	0	1	4	0	0	1
	Female	0	0	0	8	0	0	3
	All	0	0	1	6	0	0	2
Bambara beans	Male	10	3	3	0	0	0	2
	Female	22	0	11	0	0	0	5
	All	15	2	6	0	0	0	4
Cowpea	Male	2	2	2	5	7	2	3
	Female	2	0	4	2	0	0	2
	all	2	1	3	3	5	1	3
Plantain	Male	0	0	4	1	3	12	3
	Female	0	0	0	1	4	8	2
	all	0	0	2	1	4	10	3
Cocoyam	Male	0	0	0	0	15	7	4
	Female	0	3	0	3	31	8	6
	All	0	1	0	2	20	7	5
Tomato	Male	0	2	6	1	19	0	6
	Female	8	0	7	3	4	2	4

Crop	Sex of Cultivator of plots	Percentage of plots under different crops						
		Weila	Mansie	Subinso	Nsawkaw-Tanoson-Njau	Kokoago	Buoko	Total
	All	3	1	6	2	14	1	5
Garden egg	Male	0	2	2	1	1	0	1
	Female	4	8	6	3	0	2	3
	All	2	4	3	2	1	1	2
Okro	Male	2	7	7	5	3	0	4
	Female	8	6	10	17	0	0	9
	All	4	6	8	11	2	0	6
Pepper	Male	2	2	4	10	4	2	4
	Female	6	8	6	20	9	7	12
	All	4	4	5	5	6	9	8
Cashew	Male	6	5	12	24	2	2	9
	Female	2	6	1	20	0	0	7
	all	4	5	8	22	1	1	8
Teak	Male	0	2	1	0	0	7	1
	Female	0	0	0	0	1	0	1
	all	0	1	1	1	0	5	1
no of men's farm plots		62	60	98	83	94	57	454
no of women's farms plots		51	36	73	106	45	53	364
total no of farms plots		113	96	171	181	139	110	818

Table 2.2 Crops cultivated by men and women

Crop	Sex of Farmer	Percentage of farmers growing specific crops						
		Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	Total
Yam	Male	100	89	87	91	48	65	81
	Female	68	42	51	68	64	64	60
	All	86	77	71	88	55	65	71
Cassava	Male	100	68	76	82	84	81	81
	Female	64	46	77	61	91	88	69
	All	84	57	76	70	87	84	76
Maize	Male	36	75	71	59	97	88	70
	Female	36	54	51	23	96	72	49
	All	36	65	63	39	96	80	60
Groundnut	Male	57	43	22	16	7	42	29
	Female	96	77	54	77	18	88	70
	All	74	59	36	51	11	65	48
Sorghum	Male	32	32	27	9	0	0	17
	Female	32	12	11	2	0	0	8
	All	32	22	20	5	0	0	13
Rice	Male	0	0	2	7	0	0	2
	Female	0	0	0	14	0	0	4
	All	0	0	1	11	0	0	3
Bambara beans	Male	18	11	7	0	0	0	5
	Female	50	0	33	0	0	0	11
	All	32	6	14	0	0	0	8
Cowpea	Male	0	0	2	7	0	0	2
	Female	0	0	0	14	0	0	4
	all	4	2	6	4	13	2	5
Plantain	Male	0	0	8	2	7	23	7
	Female	0	0	0	4	9	16	4

	all	0	0	5	3	8	20	5
Cocoyam	Male	0	0	0	0	39	19	8
	Female	0	4	0	7	50	16	11
	All	0	2	0	4	43	18	10
Tomato	Male	0	4	11	2	52	0	11
	Female	18	0	17	7	9	4	9
	All	8	2	4	5	44	2	10
Garden egg	Male	4	4	4	2	3	0	3
	Female	13	12	9	5	0	4	7
	All	8	7	6	4	2	2	5
Okro	Male	4	14	13	9	7	0	8
	Female	18	8	20	28	0	0	15
	All	10	11	16	20	4	0	12
Pepper	Male	4	4	7	18	10	0	8
	Female	14	12	11	33	18	32	22
	All	8	7	9	27	11	16	15
Cashew	Male	14	11	9	39	6	4	15
	female	5	8	0	32	0	0	11
	all	10	9	95	35	4	2	13
Teak	Male	0	0	0	0	0	15	2
	Female	0	4	0	2	0	4	2
	all	0	2	0	1	0	10	2
No of farmers	Male	28	28	45	44	31	26	202
	Female	22	26	35	57	25	25	187
	Total	50	54	80	101	53	51	389

Table 2.3 Percentage of monocropped and intercropped plots cultivated by men and women

Sex of cultivator	plot Monocropping or intercropping	Settlement						Total
		Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	
Male	Monocrop	37.1	45.0	34.7	26.5	59.6	45.6	41.4
	Intercrop	62.9	55.0	65.3	73.5	40.4	54.4	58.6
	No of farm plots	62	60	98	83	94	57	454
Female	Monocrop	43.1	30.6	43.8	29.2	35.6	22.6	34.1
	Intercrop	56.9	69.4	56.2	70.8	64.4	77.4	65.9
	No of farm plots	51	36	73	106	45	53	364
Total	Monocrop	39.8	39.6	38.6	28.0	51.8	34.5	38.1
	Intercrop	60.2	60.4	61.4	72.0	48.2	65.5	61.9
	No of farm plots	113	96	171	189	139	110	818

Table 2.4 Dominant cropping systems

Percentage of plots under cropping system	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	
yam-cassava	28.3	13.5	14.0	30.2	8.6	11.8	18.5
sole maize	2.7	16.7	11.1	7.9	20.9	14.5	12.0
maize-cassava	1.8	1.0	7.6	6.9	20.1	9.1	8.2
Groundnut	14.2	10.4	8.2	8.5	1.4	3.6	7.6
cassava-groundnut	3.5	6.3	3.5	6.9	2.2	20.0	6.6
other groundnut intercrops	14.2	13.5	7.0	9.0	.7	3.6	7.7
yam-cassava-maize	1.8	10.4	8.8		3.6	3.6	4.4
sole cassava	.9	2.1	8.8	.5	7.2	5.5	4.3
sole yam	4.4	5.2	3.5	2.6	4.3	5.5	4.0
No. of farm plots	113	96	171	189	139	110	818

The dominant cropping systems in the northern parkland zone include yam-cassava intercrops , yam-cassava-maize intercrops, groundnut intercrops, maize-cassava and sole maize. In the southern high forest fringe, at Buoku, sole maize or

intercrops (maize-cassava and groundnut-cassava) are more important. Cassava monocrops are also important at Subinso and Kokoago, and tomatoes at Kokoago.

2.2 Farming strategies

Within the Brong Ahafo transition zone five styles (or underlying strategies) of farming can be found, which reflect different degrees of intensification or commercialisation of agriculture and different paths to increased production:

- Extensive cultivation using land tilling and mounding technologies within a distinct bush fallowing system in which land is rested for three or more years. Yam is frequently the most important crop in this system, but is usually intercropped with a variety of other crops. Farmers are concerned with tree regeneration, and look for well regenerated areas in which to make new farms.
- Extensive cultivation of monocrops such as maize or groundnuts, or a narrow range of intercrops, such as maize-cassava and groundnut-cassava, within shorter fallowing regimes. Farmers are less concerned with the regeneration of the tree cover, but manage soils without application of inorganic fertilisers.
- Extensive cultivation of monocrops (usually maize) using inorganic fertiliser on land which has been stumped and ploughed. Cultivation is on a permanent basis on the same tract of land.
- Intensive cultivation on smaller areas of land of vegetable crops using inorganic fertiliser. These are frequently cultivated in complex cropping sequences alternating minor season and major season cultivation, extending periods of cultivation and minimising fallows.
- Intensive cultivation of smaller areas, with complex multiple cropping sequences, which focus on risk management and matching crops to soils. These usually occur in areas which were originally cultivated with inorganic fertilisers on soils which have been stumped and ploughed, in which soils are often exhausted.

Intensification of agriculture can be achieved through:

- investment in high input agriculture on extensive land areas;
- investment in high input area over small areas in which the aim is to maximise the impact of limited investments in inputs;
- extensive cultivation through investments in large amounts of hired labour to maximise the area under cultivation and total yield;
- intensive cultivation using hired labour and intercropping which aims to maximise returns to labour by maximising returns to smaller plots.

Given the abundance of land, the low cost of land and the relative high costs of inputs and labour, farming strategies tend to focus on maximising returns to investments in inputs and labour rather than by investing in land-saving technologies.

These various styles of farming compete and interact with each other, transform the soil and environment, impact upon each other defining the space that each can occupy, and define the possible niche for the totality of cropping systems. While policies may attempt to favour one farming style, other farming styles may be able to effectively mobilise resources to challenge the cropping strategies that are officially supported by government and international policy directives.

The dominant crops vary from area to area in relation to ecology, agricultural infrastructure, market niches that farmers have learnt to exploit, and changing policy incentives and disincentives. Agricultural infrastructure, market niche and policy incentives are closely interrelated, since infrastructure development is often the result of policy directives, and policy may create new market opportunities or distort existing market options. New developments within the regional economy may also have unforeseen consequences on policy. Thus the development of a modern transport infrastructure as a prerequisite for state agricultural production, also encouraged the development of markets and of migrations of networks of farmers and labourers from the Upper West Region into Brong Ahafo. This opened up new avenues of agricultural intensification based on hired labour, which had not existed before the creation of an infrastructure based on modern inputs. This has created the potentials for new forms of commercial market production which did not exist before the creation of state farms and extension services. These adaptations of farmers to modernity and changing environments are rarely studied by the modern agricultural development sector which works with a conception of replacing static traditional agricultural practices with modern techniques.

2.3 Fallowing and permanent cultivation

Much of the literature on agricultural modernisation argues that population growth creates land pressures on fallowing systems. It is argued that while fallowing systems may have been efficient in the past, population growth under modern conditions creates land scarcity. This results in short fallow cycles which prevent soils recuperating from previous cycles of cultivation, resulting in a downward spiral of impoverished soils and low yields.

Data collected from those farmers who were able to calculate the duration of the last fallowing cycle on the plots they were cultivating suggests that medium fallows of between 3-6 years prevail in the Brong Ahafo transition area, with 31 percent of farmers using longer fallows of over 7 years and 10 percent fallowing for over 10 years. There is some evidence of farmers responding to land shortage by using shorter fallows - as at Buoku where 37 percent of plots were being fallowed for periods of between 1-2 years. However, at Kokoago, adoption of intensive farming methods and inputs led to equally high rates of short fallows. At Kokoago, 39 percent of farmers used short fallows of 1-2 years. At Subinso 23 percent of farmers used 1-2 year fallows despite low land pressures (see Table 2.5).

In the parkland settlements in which yam farming is the major activity, short fallows are rare. Only 5 percent of Nsawkaw, 10 percent of Weila and 14 percent of Mansie farm plots were previously fallowed for periods of 1-2 years (see figure 2.7). There also seems to be some evidence of matching crops to land and to fallow intervals on the land. This is reflected in the high percentages of monocrop cassava grown on short fallows and the high percentages of yam (usually intercropped with cassava) grown on medium-long fallows (see table 2.6). However, there is no direct correlation between specific cropping system, nutrient needs of crops, and fallow system, since many farmers have sufficient land to allow for fallows of between 3-6 years with all crops, and factors other than soil restoration are important in fallowing, including build up of pests and weeds in the soil.

Table 2.5 Fallowing intervals on farm plots

No of years land last fallowed	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Continuous cropping			4.8		1.9		1.2
1-2 years fallow	10.0	14.3	22.9	5.2	39.3	36.7	21.1
3-6 years fallow	34.3	42.9	59.0	41.8	45.8	50.6	46.2
7-10 years fallow	42.9	35.7	8.6	29.9	10.3	5.1	21.1
more than 10 years fallow	12.9	7.1	4.8	23.1	2.8	7.6	10.4
No of farm plots	70	70	105	134	107	79	565

Figure 2.2 Fallow intervals

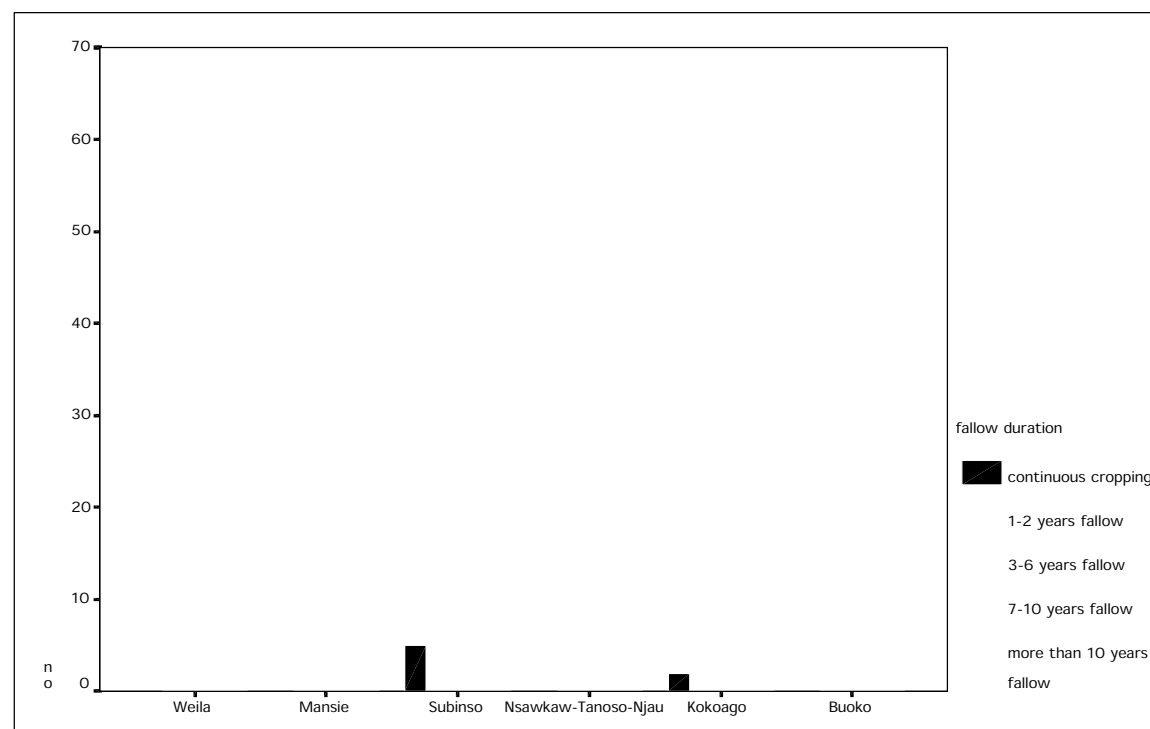


Table 2.6 Fallow intervals in cropping systems*Percentage of plots under different fallowing intervals in different cropping systems*

Cropping system	Continuous	1-2 years	3-6 years	7-10	over 10	No. of farm Plots
	Cropping	fallow	fallow	years fallow	years fallow	
Yam-cassava	1	12	36	36	15	113
Yam-maize	.	13	67	13	7	15
Yam-cassava-maize (%)	.	8	58	29	.	24
Maize-cassava	2	22	46	22	9	46
Sole maize	3	29	47	10	11	62
Sole groundnut	.	26	44	18	13	39
Cassava-groundnut	.	29	49	15	7	41
Sole cassava	.	42	42	12	4	26

Table 2.7 Fallow intervals for yam plots at Weila, Mansie and Nsawkaw

Settlement	Cropping system	1-2 year	3-6 years	7-10	over 10	No. of farm plots
		fallow	fallow	years fallow	years fallow	
Weila	yam-cassava	14	29	52	5	21
Mansie	yam-cassava		36	64	.	11
Mansie	yam-cassava-maize	.12	50	38		8
Nsawkaw	yam-cassava	2	28	40	30	43

2.4 Farmers' adaptive strategies

The next section examines how farmers have adapted their farming systems in response to economic development, infrastructure development, agricultural information systems, changing policy frameworks, and changing and competitive markets. It also examines how they respond to environmental and production problems which have emerged in their farming systems.

2.4.1 Ecological adaptation

Ecological adaptations include the matching of crops to specific micro-environments. The moist loving tropical forest crops of plantain and cocoyam are predominant within the localities situated in semi-deciduous forests. Within the drier northerly areas they are exploited in the gallery forest areas within valley bottom areas. On the grassy slopes of the driest area sorghum and bambara beans become more significant crops particularly at Weila. Yams are more important in the woody parkland areas of the northern transition zone where small, fast growing trees predominate. However, specific varieties of yams have also been adapted to the moist forest environments, including *Kokoase*, a forest yam that can grow in the shade of trees, and is often cultivated under cocoa trees. While groundnuts are usually exploited in savanna areas, they have also been grown from before the beginning of the twentieth century in specific grassy environments within dominant forest mosaics. Groundnut cultivation is also extending into degraded soils and soils which have been transformed by ploughing, in which it is difficult to grow other crops. Maize and cassava are grown in both the forested environments and also within the savanna-forest mosaics. Within moist forest zones it is often grown in environments which have been transformed through ploughing, in which the original forest environment has been stumped and is now replaced by grassland.

2.4.2 Impact of agricultural policy and infrastructure on farming practice

The development of a modern state agricultural sector and of a supporting agricultural infrastructure has had an important effect upon the farming systems in Brong Ahafo in both northern parkland and southern high forest fringe communities. Nevertheless, this modern agricultural infrastructure has had limited impact on farmers' own cropping systems. The effect of agricultural modernisation on agriculture at Subinso is clearly evident 2 kilometres from the former State Farm at Branam. However, at a radius of 10 kilometres and more in settlements such as Mansie and Weila, the impact of modern agricultural services become minimal, and tractor ploughing and fertiliser applications are extremely marginal. Within the high forest fringe area, the influence of high input agriculture is evident at Kokoago, with high rates of fertiliser usage and tractor ploughing services by farmers on lands which have been stumped. However, these developments are not typical of high forest fringe areas, most of which, like Buoku, use no fertilisers and hire manual labour rather than tractor ploughs. Table 2.8 shows the extent of usage of inputs and modern agricultural technologies on the various farm plots cultivated by farmers in the various settlements in the survey. Table 2.9 shows the proportion of farmers that use some fertiliser on any of their farm plots and table 2.10 shows the small proportion of farmers who hire tractor services in contrast with the overwhelming reliance by most farmers on hired manual labour. Large numbers of farmers throughout the survey area invest in hiring labour for weeding and clearing, but few farmers outside of Subinso and Kokoago make investments in high input technologies.

Table 2.8 Usage of inputs and mechanised technology on farm plots

High input usage	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw- Tanoso- Njau	Kokoago	Buoko	
<i>Percentage of farm plots cultivated with inorganic fertiliser:</i>							
Male plots	.	1.8	5.1	2.4	8.7	.	7.8
Female plots	2	.	9.6	.	8.9	.	3.3
All plots	0.9	1.1	7.0	1.0	3.3	0	5.8
<i>Percentage of stumped farm plots:</i>							
Men's plots	.	1.7	21.9	1.2	22.3	1.8	10.0
Women's plots	5.9	2.8	27.4	10.4	8.9		10.7
All plots	2.7	2.1	24.3	6.3	18.0	.9	10.3
<i>Percentage of farm plots cleared with tractor:</i>							
Men's plots	.	.	11.2	1.2	9.6	8.9	5.8
Women's plots	.	.	23.3	.9	2.2	.	5.2
All plots	.	.	16.4	1.1	7.2	4.6	5.5
No of male farm plots	62	55	98	83	94	57	449
No of female plots	51	36	73	106	45	53	364
No of farm plots	113	91	171	189	139	110	813

Table 2.9 Percentage of men and women using inorganic fertiliser

Percentage of farmers using inorganic fertiliser	Settlement						Total
	Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Men	.	4	11	5	58	.	13
Women	.	.	11	.	18	.	3
All	.	2	11	2	41	.	9
no of men	28	28	45	44	31	26	202
no of women	22	26	35	57	22	25	187
Total respondents	50	54	80	101	53	51	389

Table 2.10 Investments in hired labour and tractor services

Sex of farmer	of Hired labour and tractor services	Settlement						Total
		Weila	Mansie	Subinso	Nsawkaw-Tanoso-Njau	Kokoago	Buoko	
		(%)	(%)	(%)	(%)	(%)	(%)	(%)
Male	Hired labour for clearing	64	57	40	57	64	58	58
	Hired tractor services	.	.	18	2	11	.	6
	Hired labour for weeding	68	46	53	55	88	69	60
Female	Hired labour for clearing	77	81	71	71	58	92	76
	Hired tractor services	.	.	26	2	8	.	6
	Hired labour for weeding	64	62	68	51	68	76	62
All	Hired labour for clearing	70	69	46	65	55	75	63
	Hired tractor services	.	.	22	2	10	0	6
	Hired labour for weeding	66	54	60	53	79	72	61
no of men		28	28	45	44	31	26	202
no of women		22	26	35	57	22	25	187
Total respondents		50	54	80	101	53	51	389

2.5 Case studies

2.5.1 Case study 1: Kokoago - Agricultural intensification through adaptation to agricultural infrastructure collapse

Kokoago lands lie adjacent to the now defunct Subinja Irrigation project, which promoted irrigated vegetable farming with high inputs. However, farmers at Kokoago had little interaction with this project. Kokoago also lies close to the Wenchi State Farms. The farmers' first experiences of agricultural modernisation arose from interactions with these state farms and the mechanised tractor ploughing services which they introduced. However, the most important project which influenced the subsequent course of agricultural development at Kokoago was the creation of the Ghana National Reconstruction Corps (GNRC) in 1978, in its immediate vicinity. The project developed a large mechanized farm which focussed on maize production on permanent plots with applications of inorganic fertiliser. The GNRC project was not a success and in 1982 it collapsed. However, the project had three main influences of Kokoago:

1. Many inhabitants from Kokoago were employed by GNRC and they invested their wages in agricultural development in Kokoago, based on the high input variety that was promoted by GNRC.
2. The GNRC also introduced tractor ploughing services and made subsidised inputs available to farmers.
3. Farmers were further encouraged to use inputs by the provision of credit lines for input purchase.

When the GNRC collapsed, farmers at Kokoago also moved onto the lands that had been stumped for the project, and used them for maize cultivation.

Farmers at Kokoago have taken up mechanised maize cultivation with fertilisers. But large numbers of farmers also grow maize and cassava intercrops without fertiliser applications. They have also worked out new methods of intensive tomato cultivation for their own rainfed conditions. Tomatoes are planted throughout both the major rain season and the minor season. The beds on which tomatoes are cultivated are manually ridged up. During the weeding process, the tomato beds are further ridged up - the soil is scooped up and placed over the weeds and tomato stalks. This is usually carried out twice, but during dry years a further weeding and scooping up of the soil can occur. The objective of this is to conserve soil moisture. This results in a large proportion of the tomato stalks being buried under soil. The fruits are not staked, nor do they hang over the ridges. They are rather perched above the scooped-up soil ridges. Tomato cultivation is intensive, and carried out on small plots under an acre in size. Frequently maize follows the tomatoes, benefiting from the residues of fertiliser application within the soil.

The intensification of tomato cultivation at Kokoago focuses on achieving high returns to labour, rather than returns to land, and maximises the application of small quantities of fertiliser. This is achieved by intensive and complex crop rotations which focus on intricate timing of rotations between minor and major systems. The farmers attempt to grow the maximum number of crops in a three-year cropping cycle by rotating major season cultivation with minor season cultivation. This involves complex intercropping systems in which new crops may be planted during weeding, before the original crop has been harvested. After the three-year period, the land is usually fallowed for a short period. This mixed cropping-rotation system focuses on maximising the crops that can be taken from the land with minimum inputs for land preparation and

fertiliser application. Intensification of cultivation takes place on lands which have been stumped and transformed into grassland by the previous activities of state mechanised farms and by the modern mechanised agricultural infrastructure. These adaptations take place in the context of a state agricultural infrastructure that has collapsed.

Maize and tomato cultivation are mainly the preserve of men. Many women cannot afford to make the necessary investments in labour and inputs to fully participate in this sector. Many women at Kokoago farm in forest areas, growing small quantities of roots and tubers crops, such as cocoyam, yam and cassava on small farms. The women find it easier to cultivate forest land with cutlass rather than till grassland areas. The grassland areas become the preserve of men with capital, who can invest in fertilisers, tractor services or hire large numbers of labourers to gain good yields from grassland and stumped land.

The natural environment at Kokoago has been transformed considerably during the past 30 years. The original settlers came to Kokoago, to farm cocoa, from Asuie (near Techiman). The senescence of cocoa occurred during the dry phase of the 1970s and 1980s and farmers found it impossible to successfully replant it. Farmers thus moved into food crop and vegetable cultivation and found the grassland environments subsequently created by stumping and ploughing to be the most productive. Many farmers at Kokoago continue to farm with inputs in spite of the increasing costs and the vagaries of climate (eg. erratic rainfall). However, it is not clear how sustainable these farming system will prove to be.

2.5.2 Case Study 2: Subinso - decline of agricultural input technology

In its heyday Subinso was a centre of agricultural modernisation in Brong Ahafo. Being near to Branan State Farms, farmers at Subinso benefited from subsidised inputs and tractor services. During the 1970s and 1980s, government services made cheap subsidised tractor ploughing services and fertilisers available to farmers in the vicinity of the state farms. Private entrepreneurs also invested in tractors and offered tractor ploughing services to farmers. This led to the expansion of mechanised maize farming within the vicinity of Subinso and many farmers began to transfer resources from yam farming on fallowed land to permanent cultivation of maize on land which had been stumped and cleared of its tree cover. Agricultural modernisation was further enhanced by the development of the Subinso Agricultural Project, which was supported by German donor funding, German technical assistance and the Catholic Diocese of Sunyani.

With implementation of structural adjustment, divestiture of state agricultural input procurement programmes and removal of subsidisation, the foundations of agricultural modernisation were undermined and both the state farms and the Subinso Agricultural Programme have now collapsed.

While residual effects of high input farming can still be seen in the large number of stumped plots at Subinso and the usage of tractor ploughing, there has been a marked decline in the use of inputs in recent years. A survey of agricultural practices in the Wenchi district in 1993 reported that 44 percent of farmers at Subinso used fertiliser and 51 percent used tractor ploughing services (Amanor, 1993). This compared with similar surveys in settlements situated in the vicinity of State farms where there are well-developed state agricultural infrastructure and agricultural support services. In a survey of agriculture

around Ejura, for instance, in the transition zone of northern Ashanti (close to Ejura State Farm, the largest state farm in Ghana), Tripp (1993) found that 58 percent of farmers prepared their land with tractors and 66 percent of farmers used fertiliser. In contrast with this, the 1993 survey found low or no usage of inputs in other important maize-producing areas in Wenchi and Kintampo districts. Around Badu, on the fringes of semi-deciduous forest, one of the leading maize-producing settlements in Brong Ahafo, farmers used no tractor ploughing and no fertilisers. At Mansie, only 7 percent of farmers used tractor services and 18 percent used fertilisers. In the present survey, input usage at Subinso was found to have dramatically declined. Only 11 percent of Subinso farmers are using inorganic fertilisers and 22 percent are still ploughing with tractors.

Soils at Subinso have become exhausted as a result of permanent cultivation. Ploughing also destroys the organic matter layer in the soil, turning the subsoil over the topsoil. Farmers who have stumped their lands and regularly use ploughs are dependent upon fertilisers to gain good yields. Without application of fertilisers they cannot get good yields of maize. Farmers at Subinso complain of the high cost of inorganic fertiliser, as well as problems with availability. Because of the increased cost, farmers who use fertilisers have tended to reduce their application, frequently applying less than half of the recommended dose. However, the cost of fertiliser is not reflected in maize prices, since large quantities of maize are being produced in Brong Ahafo without the use of inputs. Erratic rainfall has also become a problem and investments in fertiliser will not pay off without proper rainfall. As a result of all these constraints, production of maize is declining at Subinso. Farmers are moving away from maize production into groundnuts, which do not require the use of fertilisers. They are also growing more cassava, which can provide satisfactory yields without application of fertiliser and which fetches a good price. A *gari* processing factory has been set up in Subinso, creating a steady demand for cassava. Farmers are also increasingly diversifying production, engaging in multiple cropping, planting a variety of different crops on the same land which are adapted to different environmental conditions as a risk management strategy. Areas under extensive maize cultivation are contracting, smaller areas are being cultivated with lower applications of fertilisers and farmers are experimenting with diversified cropping systems on smaller farm plots. This includes planting crops which mature at different times, and crops which are adapted to dry conditions such as sorghum and bambara bean alongside crops which require more moisture.

2.5.3 Case study 3: Buoku - commercialisation without inputs in a changing environment

Like Kokoago, Buoku is situated in the dry forest zone. It has witnessed considerable change in the environment following the 1983 bushfire calamity (when wildfires spread through the high forest zone of Ghana, destroying much of the tree growth). Buoku was originally a cocoa growing area in which the main food crops grown were plantain and cocoyam. From the 1980s onwards, bushfires have become increasingly frequent and the environment has been considerably transformed. Many of the former characteristic forest tree species have disappeared and been replaced with *Chromolaena odorata* (known in Ghana as 'Acheampong'), as well as grassy species. Farmers can no longer grow cocoa, and plantains and cassava do not grow as well in the past. With the decline of cocoa, farmers have turned to maize as a replacement cash crop. In the past, plantain and cocoyams were largely grown for domestic consumption (for, as bulky perishable crops they did not provide a stable cash crop). Groundnuts and cassava also became important cash crops.

Groundnuts have been cultivated here for many years. Older inhabitants of Buoku remember that, at the beginning of the century, groundnuts were cultivated in small plots in areas in which the dominant vegetation was a type of transitional mosaic between forest and savanna grassland, known locally as *npenpe*, a form of open woodland with small trees. However, the areas of groundnut cultivation have increased, and this crop is largely cultivated in the drier grassland and woodland mosaics. Groundnuts are often intercropped with cassava on plots using short rotations. Thirty-nine percent of cassava/groundnut plots were made on farms using a fallow of 1-2 years, and 56 percent of the plots used a fallow of 3-6 years. Fallow intervals with monocropped maize were also short. 42 percent of maize plots were cultivated on plots which had been previously been fallowed for 1-2 years, and 58 percent on plots which had been fallowed for between 3-6 years. Both types of plots were normally cultivated for two years - 77 percent of groundnut-cassava plots were cultivated for two years and 68 percent of maize plots. However, these two cropping systems were farmed in distinct ways: all the groundnut-cassava plots were planted in mounds. By contrast, only 18 percent of maize plots were planted in mounds. Farmers identified 63 percent of groundnut-cassava farm plots as forest farms and 36 percent as savanna farms, while 81 percent of maize farms were identified as forest farms and 19 percent as savanna farms.

This suggests that the growing prominence of groundnuts cannot be seen primarily as a response to soil impoverishment. It forms part of a series of innovations which respond to changing environments and which result from the decline of cocoa, previously the major cash crop. These innovations seek to intensify food crop production in different environments in the context of a certain degree of land pressure. This in turn results from a complex of factors including appropriation of farm land by the Forestry Service for the creation of a forest reserve. Attempts to intensify crop production in more forested environments have involved planting maize. In more savanna environments, they have involved planting mixtures of groundnuts and cassava. The combination of groundnut and cassava reflects an attempt to intensify production through mixed cropping. The movement to maize, groundnut and cassava, suggest an adaptation of crops which can be farmed intensively within specific microenvironments within the locality to realise the most profitable investments in land and labour.

These two cropping systems also reflect different gender and social group interests. Sole maize production is largely the preserve of richer male farmers who can hire large tracts of land and labour. Eighty-one percent of sole maize farms were managed by men. In contrast with this 59 percent of women and 41 percent of men were involved in groundnut and cassava cultivation. Groundnut plus cassava is frequently produced by women with less access to hired labour on smaller family plots. It represents a form of intensification which seeks to gain maximum yield from smaller plots and lower inputs of labour. Thus, in the survey, 41 percent of groundnut and cassava plots were family lands as compared to 25 percent of maize plots. The average size of groundnut and cassava plots was 1 acre (the smallest plot was 0.25 acres, the largest plot was 2.5 acres [standard deviation, 0.59]). This compares with an average of 4.2 acres for sole maize plots (within a much wider range of acreages in which the largest farm plot was 30 acres and the smallest 1 acre [standard deviation, 6.96]). This suggests that maize forms the most important avenue to investment by rich farmers. Cassava-groundnut mixtures on small plots of land form the most important cash-crop avenue for farmers who cannot afford to invest in land and labour for extensive maize cultivation.

Given recent dramatic changes in the environment at Buoku, it is not clear to what extent farmers can continue to manage these two cropping systems on a sustainable basis, or if the intensive cultivation of these two systems will lead to a down spiralling cycle of declining yields, exhausted soils, degrading vegetation cover and increasing weed infestations.

2.5.4 Case study 4: Bush fallowing and intensification in the yam belt

Settlements, such as Weila, Mansie, and Nsawkaw lie beyond the area in which high input technologies have been disseminated. They have depended upon yam as their staple cash crop and have responded to such factors as the market opportunities created by the development of road transport within the Brong Ahafo region, the emergence of major food wholesale markets (such as Techiman), and the availability of hired labour, by extending production using hired labour.

Yam is a crop which requires soils rich in organic matter. It also requires a lot of sunlight. Stakes are needed for the tendrils of yam to climb up, in order to gain access to sufficient light. It thus requires an environment with many small trees, which can be used as 'live' stakes, or which can be cut as poles to make stakes on which the yams will climb. When trees are used as stakes, their canopy needs to be removed to prevent them shading out the yam. This is usually achieved by setting fire to the standing tree and burning the branches and canopy. The trees often recover later by putting out new branches and shoots and coppice. Some farmers deliberately kill the tree off by burning its base and roots, to prevent new shoots developing during the yam cultivation cycle, developing leaves and shading out the yam tendrils. Other farmers, who are concerned with preserving trees because of a perceived shortage, may choose to prepare the tree by lopping its branches.

Yam cultivation thus requires robust small trees which can easily regenerate from root shoots, suckers and coppices. The parkland zone is the ideal environment for this. Yams are not a crop which adopt easily to high input technologies. They respond poorly to fertiliser applications (Van der Zang *et al.* 1980), and often become tasteless, develop unattractive hairy appearances, and do not store well. Accordingly, the best land within the parkland environments is reserved for yam cultivation. Other crops follow yam on newly cultivated land or are planted on less well regenerated lands and lands which have grass cover. At Subinso, yams are usually grown in distinct locations, apart from the stumped lands on which maize has been grown with fertilisers. (However, there are some variations. While most farmers at Subinso considered fertilisers to have a poor impact on yams, they noted that in the Atebubu area of Brong Ahafo, farmers were successfully cultivating yams in fields which had been fertilised.)

Yam is a crop which requires considerable labour. The tubers are planted in large mounds into which surrounding organic matter is scooped. Since yam requires rich soils, it is cultivated for short periods on plots which are bush fallowed. Within the low populated parkland areas of Brong Ahafo there is still considerable land available to enable sufficient fallowing to support soil recycling, and produce good yields of yam.

There are numerous varieties of yams that have been selected by humans from their wild forebears (many of which were actually poisonous). Yams continue to be selected up to the present day, with new varieties coming in and some old varieties

becoming less popular. The most popular varieties of yams cultivated today include 'Tiller', 'Lariboko', 'Pona', 'Matches', and 'Akaba'. All of these varieties are popular because they do not require the most fertile soils, can withstand some element of drought and can provide good yields on soils cultivated with short to medium fallows. Several varieties formerly cultivated by farmers are said to be less popular today because they were heavy feeders and required very fertile soils from areas which had been rested for many years. This included 'Dahoba', 'Lobre', 'Dongo', 'Sejo Siato' (Deg language) and 'Tarikoo' (Deg). Some respondents argued that varieties such as *Dahoba*, *Sejo Siato* and *Tarikoo*, required lands which had been fallowed for more than twenty years. These are said to have become nearly extinct. Some farmers also allege that *Tiller* and *Matches* have become popular in areas without many trees because they can be grown without staking materials. Coursey (1967) has noted that many varieties of yams are selected by farmers on the basis of water requirements, drought tolerance, and length of maturity. Those requiring long maturation periods are grown in the wettest areas with shortest dry seasons. In wetter area farmers may grow several varieties with different maturation to achieve a greater spread of crops through the year.

Other factors determining the selection of yam varieties include, yield, reproductive capacities, and market demand related to gastronomical qualities. *Matches*, *Asana*, and *Teacher Takyi*, are recently developed or adopted yams which have rapidly spread during the 1990s. All these yams yield heavily, and can reproduce large yams from smaller sets than other yams. *Matches* gained its name from the fact that when first cultivated the sets which farmers planted were the size of a match box. Subsequently farmers have increased the size of the sets to gain larger yams.

Market preference and price factors also play important parts in determining the varieties grown. Although *Lariboko* is considered to be the superior yam locally for *ampesie* (boiled slices of yam eaten with stew), *Pona* is the preferred yam on the Accra market and also the preferred export yam to European cities. It is also a good *ampesie* variety. However, on the Kumasi market, the dominant demand is for a yam which can be also pounded into fufu. *Tiller* is the yam which best fits this role. Thus *Pona* and *Tiller* have become the dominant yams produced for the market. Other yams, which are locally recognised as important have become less important because they are not popular on the urban market. *Nkanfo*, *Tepro* and *Bronipae* are examples of yams which are less in vogue on urban markets today, and have been displaced in field cultivation. However, farmers usually integrate several varieties of yams. These include early maturing varieties, which tend to have poor storage qualities, with long-maturing varieties of water yam (*Dioscorea alata*), which can be stored over long periods and thus can meet domestic needs for most of the year. *Matches* and *Akaba* are the two most important water yams grown in the Brong Ahafo transition zone. Domestic requirements and the need for an all-year-round-income are also met by intercropping cassava and maize with yams - the maize is stored in barns and the cassava can be maintained in the soil for up to two years and is harvested when required.

Farmers have responded to intensification in yam production systems by adapting genotypes to environmental conditions, selecting higher yielding varieties that can be produced more intensively, and changing the varieties they plant to respond to market demand. They have successfully responded to the commercialisation of yam production which has developed into an important urban-market and export crop.

This capacity for adaptation stand in marked contrast to the predictions of doom which have tended to dominate the literature (Purseglowe, 1978). It has been estimated that yams contribute about 16 percent of agricultural GDP (AgGDP), ranking second behind cassava which contributes 19% of AgGDP. Cocoa, the leading export crop, which receives over 45 percent of agricultural research funds, produces 13 percent of AgGDP (Plan Consult, 1993; Amanor *et al.*, 1993).

Yams are usually cultivated on newly cleared land and followed by other crops. New plots are cleared each year for the yam farms on well-regenerated land. Yams are usually intercropped and the yam is followed by other crops. At Weila, bambara bean frequently precedes yam as a crop, and is used to break up the ground. It is planted early in the minor season. After it is harvested yam mounds are prepared and the dry leaves and vines are incorporated into the mounds to enhance the organic matter. Yams are usually intercropped with a wide variety of crops of which the most popular include cassava, maize, sorghum, and vegetables. Although yam is an important crop it has received little support from agricultural services, until very recent years. The technologies used in yam farming are those of the farmers, with no recommendations for improved varieties or cultivation techniques being worked out and disseminated by the agricultural extension systems, although researchers in Kumasi at Crop Research Institute are now working on yam.

Historically, in the northern transition zone after cultivating yam husbands passed on their plots to their wives who then cultivated groundnuts. Clearing was a major constraint for women, and this arrangement enabled them to plant their groundnuts on plots which had already been cleared and mounded. Increasingly, men in the main yam growing areas are intercropping their yams with second year crops, particularly cassava and maize. With good market prices for groundnuts men are also following yam with second year groundnut. At Weila 26 percent of men now plant groundnuts and 20 percent also plant groundnuts at Subinso. As a result of this fewer husbands now provide plots for their wives. A common arrangement at Mansie is for a man to divide his old yam farm into half, and to allocate one half to his wife (wives) while he plants groundnut or cassava on the second half.

Maize is increasingly becoming an important crop in the yam farming belt, grown on fallow land without inputs. With the rise in price for inputs, maize production within the yam belt is displacing production in former high-input maize producing settlements such as Subinso, where high fertiliser prices do not reflect in the market price for maize, and soils cannot produce good yields under natural regeneration. Cassava has also become important in yam systems and is frequently intercropped with yam. The cassava tubers are planted later than the yam.

Intensification of agriculture in the yam zone is reflected in the expansion of intercropping systems which prolong periods of cultivation and diversify the range of cash crops grown. However, this is largely an attempt to maximise returns to investment to labour and to mounding rather than a response to shortage of land. This intensification of male agriculture may have a negative impact on women's agriculture as men allocate less cleared land to women.

Decline in yam production systems have been predicted for a long time, largely premised on the need of yam varieties for good quality soils, long fallows, and trees as live stakes or stake poles. This decline has not materialised and yam production has rather been commercialised. Innovations in yam production system have been based on the selection of more robust, drought resistant species that can tolerate less fertile soils (or are less heavy feeders); complex intercropping systems which maximise the cropping from one piece of land before it is fallowed; and careful land management strategies, which assure that land for yam cultivation is allowed to sufficiently regenerate.

2.6 Fallow tree resources and agriculture

In the environmental policy literature for Ghana, the Brong Ahafo region is frequently portrayed as a zone prone to desertification in which savanna is advancing and forest retreating, largely as a result of human intervention and farming practices. This literature makes no attempt to differentiate the diversity of environments within Brong Ahafo, and the different tree resources which exist in the area. Two basic types of tree formations exist in the area: dry semi-deciduous forest and savanna woodland. While the former dominates in the south of the transition zone it also occurs in riverine areas as gallery forests and on the sites of old settlements, such as at Jensosso . Within the southern area mosaics of savanna grassland and parkland also exist which may reflect relicts of earlier transformations of the environment, or which may relate to edaphic features. Distinct tree species characterise these two formations. Those in the woodland areas tend to be smaller, numerous, robust, more drought-resistant, fire resistant and able to regenerate from coppice regrowth, root shoots and suckers (Basset and Boutrais, 2000; Fairhead and Leach, 1998). Those in the semi-deciduous forest areas are often larger, taller, less numerous, more vulnerable to fire and other stresses and less able to regenerate from coppice and root shoots.

In both areas trees are valued by farmers in bush fallowing systems as playing important roles on farm. Most farmers preserve some tree varieties on their farms. In the parkland environments the most commonly preserved trees on farms include *Danielli oliveri*, *Vitallaria paradoxa*, *Parkia biglobosa*, *Pterocarpus erinaceus*, *Terminalia glaucescens*, *Anogeissus leiocarpa* , *Azelia africana*, *Khaya senegalensis* and *Margaritaria discoidea*. *Daniellia oliveri* is recognised by farmers as having a favourable impact on soils and on crops planted in its vicinity. *V. paradoxa* and *P. biglobosa* are important for their fruits and oil extracts. Within the yam farming belts these tree resources are important for staking yams and yam farms are made in areas with large densities of small trees..

Table 2.11 Tree varieties preserved on farm plots

Tree species preserved in farm land	Settlement						Total (%)
	Weila (%)	Mansie (%)	Subinso (%)	Nsawkaw-Tanoso-Njau (%)	Kokoago (%)	Buoko (%)	
<i>Daniella olivieri</i>	24	31	35	49	.	.	
<i>Vitallaria paradoxa</i>	79	28	19	25	.	.	28
<i>Parkia biglobosa</i>	26	29	35	17	3	.	19
<i>Anogeissus leiocarpa</i>	?	17	15	17	13	7	12
<i>Terminalia glaucescens</i>	.	16	8	4	14	6	8
<i>Pterocarpus erinaceus</i>	.	10	11	8	6	2	7
<i>Margaritaria discoidea</i>	.	7	13	6	31	7	12
<i>Borassus aethiopum</i>	.	1	11	.	.	22	5
<i>Afzelia africana</i>	?	?	5	13	2	5	?
<i>Ceiba pentandra</i>	.	6	6	11	17	27	11
<i>Khaya grandifoliola</i>	.	7	6	13	9	2	8
<i>Cola gigantea</i>	.	.	1	1	19	44	10
<i>Milicia excelsa</i>	?	3	1	8	9	14	?
<i>Triplochiton scleroxylon</i> ,	.	.	1	6	11	8	5
<i>Spathodea campanulata</i>	.	4	4	1	9	11	4
<i>Vitex doniana</i>	.	1	1	2	16	4	4
<i>Antiaris toxicaria</i>	.	.	1	3	8	13	4
<i>Alstonia boonei</i>	.	.	.	.	7	4	2
<i>Terminalia superba</i>	.	3	.	.	4	3	1
No of farm plots	112	96	171	189	139	108	815

In the semi-deciduous forest zone the most commonly preserved trees include *Ceiba pentandra*, *Cola gigantea*, *Milicia excelsa*, *Triplochiton scleroxylon*, *Antiaris toxicaria*, *Terminalia sp.*, *Afzelia africana*, *Khaya grandifoliola*, *Vitex doniana*, *Margaritaria discoidea* and *Alstonia boonei*. The most commonly preserved species tend to be pioneer species, which are often the most robust and fastest growing species in the semi-deciduous forest. While there are many important timber resources in this forest farmers do not have rights to these trees or to royalties from their exploitation.

Farmers within parkland environments tend to preserve more trees on farm than in the semi-deciduous forest zone. Table 2.11 shows that tree species associated with parklands are preserved on a larger percentage of farm plots than those associated with semi-deciduous forests. This is not surprising given that parkland trees are usually smaller than high forest trees, and regenerate easier from coppice regrowth. However, farmers within the forest fringe area reported more problems with regeneration of trees and change in tree cover than in the parkland. Farmers at Kokoago and Buoku reported a change in the environment following the 1983 bush fire. This scenario included annual bush fires which destroyed forest trees and prevented their regeneration, expansion of grassland and areas dominated by *Chromolaena odorata*, and increasing fuelwood shortage.

However, the picture is complex. At Buoku, elderly farmers were adamant that the savanna grassland areas have existed as long as living memory, although grassland has expanded in recent times. They argued that in the past both forest and savanna coexisted. There were many high forest species in the forest including many timber trees. Most of the large timber trees have been felled by timber concessionaires, leaving only *Ceiba pentandra* and *Cola gigantea*. Farmers claim that most of this timber has been felled in recent times, mostly during the 1980s. In some areas of Buoku, species associated with savanna coexisted with forests from long ago. Some old men remember that when they were young *Borassus* palm occurred within thick forest. In recent times the area under *Borassus* has expanded as a result of increasing incidences of bush fires and *Borassus* has become the dominant tree in some areas which were under forest. The occurrence of *Borassus* in forest suggests that there is a long history of environmental change within the area. *Borassus* may have established in previous dry spells. As the climate became wetter forest began to regenerate and displace the *Borassus*. With a subsequent dry period *Borassus* began to re-establish its dominance over forest species. The complexity of environmental change is also suggested by a wedge of savanna that intrudes down into the forest extending from Subinso to Buoku.

While most farmers within the semi-deciduous forest fringe concur that in recent years there has been considerable environmental change, this is not the case in the parkland areas. Here there are lively debates about environmental change which divide the farming population into two camps.

One camp concurs with national environmental policy frameworks about serious decline in the environment and narratives about increasing rural population leading to over-cultivation of the land, destruction of trees and “transformation of the land into the Sahara desert”.

However, a significant proportion of farmers do not agree with this narrative and articulate counter narratives that the environment has not changed dramatically. Some farmers argue that there are more trees now than in the past, since when one tree is cut it develops coppices and root shoots which will develop into multiple trees. They argue that there may be fewer large trees than there were in the past, but there are more smaller trees than before. They argue that bush fires have always been a part of the parkland environment and that there is no recent fire crisis resulting in environmental transformation, since the trees within these environments have adapted to fire.

Within charcoal producing areas within the northern transition zone these debates about environmental degradation have become highly politicised, since there are complex struggles over the control of charcoal, and these struggles are articulated in terms of the destruction of the environment and of forests that result from charcoal production. Patterns of environmental change differ in the various ecologies of the transition zone. The dynamics of land cover change and its relationship to farming systems need to be better understood rather than posing deforestation in a general framework.

Different farming systems have different impacts on the regeneration of trees on fallow and farmland. Yam farming depends upon the regeneration of trees for yam staking, and a process of promoting cutting, pruning and fire control and regeneration. In contrast with this, high input mechanised agriculture removes all the tree cover through stumping and attempts to maintain permanent cultivated plots that are free from trees to allow tractor ploughing. The expansion of maize cultivation within the semi-deciduous forest may also promote removal of tree cover. At Kokoago grasslands and stumped lands are considered prime lands for cultivation and the remaining secondary forest patches are mainly farmed by women who cannot afford investments in labour for maize production on grassland.

2.7 Farmer adaptation, innovation, and the agricultural research system

Farming systems within the Brong Ahafo region are complex, dynamic and diverse. Underlying this complexity is the ability of farmers to adapt to changing conditions which result from changes in the biophysical, market, and policy environments. While self provisioning is still important for most farmers, all the farming systems we have investigated have cash crop sectors which focus on producing for a defined market niche in which the farmers have comparative advantage as compared to farmers in other areas. These niches change with time. In the past, when agricultural policies concentrated on subsidising and distributing inputs, farmers in the vicinity of state farms and other government agricultural projects took advantage of their closeness to cheap input delivery services to engage in high input production, stumping and ploughing land and replacing bush fallow recycling of land with permanent agriculture with inorganic fertilisers and new high yielding seeds. The main impetus for this was the cheapness of subsidised inputs and government support services and not pressures of land leading to the breakdown of bush fallowing.

Farmers away from the main centres of state induced agricultural modernisation were also initially interested in the use of inputs, but found that delivery systems were not reliable and constant. Farmers at Mansie or Weila, for instance, would find it difficult getting tractors to come to their villages to plough when necessary and they would not be able to get a guaranteed supply of fertiliser from year to year. Under these conditions of insecure access to inputs, farmers paid more attention to developing alternative modes of investing in agriculture other than through state controlled inputs. They invested in significant amounts of hired labour, mainly migrant labour from the Upper West Region¹, to expand areas under crop production and to intensify weeding regimes. Thus, the expansion of yam production was made possible by the large number

¹This applies to the Western districts of Brong Ahafo served by the Wa-Wenchi road. In the Eastern parts of Brong Ahafo and Northern Ashanti, significantly more migrants, using the Bolgatanga,-Tamale-Yeji-Ejura/Techiman or Tamale-Kintampo-Techiman route would have come from the Upper East and Northern Region.

of seasonal farm labour migrants who come down from the Upper West to work in making yam mounds. These developments, in turn, were made possible by the development of a road transport infrastructure in the 1960s to support agricultural modernisation within the area and a feeder road programme during the 1970s. This facilitated the movement of migrants into the northern transition area of Brong Ahafo and the expansion of Techiman market into the largest wholesale food market in Ghana.

With the implementation of structural adjustment, policies of subsidisation of agricultural inputs and control over input delivery systems by state organs were revoked. Inputs were sold at market prices and input delivery systems were privatised. This has resulted in a crisis in high input agriculture. Many of the large firms engaged in production of food crops have collapsed or transferred their resources to other production niches. Demand for inputs has fallen, since the price of investing in inputs is not realised in market prices for crops. Few private companies have taken up agricultural input provisioning, outside of those working on contract farmer schemes, such as in cotton or oil palm sectors (which are not important sectors in Brong Ahafo). Farmers continuing to use inputs have difficulties in recovering the cost of their investments and in gaining access to reliable supplies.

As a result of this, food production centres have shifted to areas which produce crops without inputs and which still have productive soils. Some of the old high input maize producing areas are declining. Farmers have stopped using inputs, but their soils are no longer productive. With unreliable climate conditions production has become risky. Under these conditions farmers have responded by moving from heavy soil feeders to crops which can produce yields on poorer soils, such as cassava and groundnuts. This should not be interpreted as a retreat to self-provisioning, since there is a large demand for these crops and good market prices. With increasing perceptions of risk in crop production many farmers are also hedging their bets by engaging in mixed cropping of a variety of crops which respond to different conditions, which require different moisture regimes and which mature at different periods and respond to different rainfall patterns. Other options include diversification into intensive vegetable production, as at Kokoago.

In the northern transitional parkland areas yam continues to be the most important crop, and farmers still manage to produce yam within a bush fallowing system. However, the selection of yam varieties is a dynamic process of matching variety to land and to market demands and tastes. There is some evidence of a process of intensification in which varieties adapted to shorter fallowing strategies are gaining ground at the expense of heavy feeders which require rich soils that have been fallowed for many years. Varieties which can withstand drier periods are also being selected. Yam farming is also being intensified through mixed cropping, particularly of yam with cassava, followed by groundnut. In some areas of the yam belt, sorghum and bambara beans are important crops, which provide security for dry years. In other yam farming areas, maize has developed into an important cash crop. Here maize is grown without inputs, in bush fallowing systems, in which shorter fallows are used than in yam production.

The ecotone between semi-deciduous forest and the forest-savanna mosaics has seen considerable transformation in cropping systems during the 1980s, particularly following the 1983 bush fire. During the 1960s the dominant crop in this area was

cocoa, which was planted from the 1920s. By the 1970s much of this cocoa would have suffered from senescence. While cocoa is difficult to replant outside of mature forest conditions, farmers in these northern fringes of cocoa cultivation suffered from drier periods during the 1970s and 1980s than between the 1920s-1940s, in conditions which were not really suitable for cocoa. Since 1983 bush fires have become a recurring phenomenon during the dry season, which has prevented trees regenerating and hampered attempts to regenerate cocoa plantations. As a result of the constraints on cocoa, farmers have increasingly moved into maize and vegetable production. This is a development which is also pronounced in the Ashanti Region.

The major maize production zone in Ghana is now situated in the forest-savanna ecotone. This includes former cocoa settlements which were previously dominated by forest, but also settlements which were situated in the dominantly savanna mosaics of this area, which have existed for a long period. While many of the settlements in this ecotone have experienced considerable environmental change and the transformation of a moist forest environment into a grassy environment, other environments have always been in dominant savanna mosaics. The dynamics of the processes resulting in the historical formation of these savanna mosaics, and the present transformation of moist semi-deciduous forest into grassland dominated areas remains unclear. It is not clear to what extent farming systems have altered the environment, and the extent to which a drier climate phase or even global climate change has impacted on the forest ecotone.

The farming systems in Brong Ahafo are also dynamic in that they are all competitive, seeking to establish a production niche in which they have a comparative advantage (or less of a disadvantage) on the market. The need to be competitive has been intensified by structural adjustment, removal of subsidies, competition with cheap imports of food crops leading to erosion of prices, and depression in incomes of urban people, as a result of devaluation and increasing unemployment. Failure to maintain a comparative advantage results in experimentation with new crops and a shift to new farming strategies.

This can be clearly seen at Subinso. Subinso was originally a yam-producing settlement in the low populated Deg (Mo) area. The development of Branam state farms, and development of input delivery services to nearby farming communities, enabled the more prosperous farmers at Subinso to develop high input maize cultivation. Well served by transport on the Wa-Wenchi road, Subinso became an important market centre and an area in which migrants settled to farm. With increasing pressures on land created by growing numbers of people investing in cheap inputs and tractor services, maize became prominent and yam declined as less prime environments existed for its cultivation. With removal of subsidies maize has lost its comparative advantage, and cassava and groundnuts have become leading cash crops. These two crops are able to provide yields on soils which have become exhausted or heavily disrupted by ploughing. The existence of a market centre at Subinso has enabled cassava to establish a comparative advantage as a cash crop, since there is a ready demand on the market for gari, and small gari-processing workshops have become established. This would not have been possible had Subinso been situated at the back of a feeder road.

In contrast, the more northerly and isolated settlement of Mansie was not able to establish a comparative advantage in maize production during the era of subsidised inputs, since it lay at a distance in which regular supplies and services could not be

guaranteed. With removal of subsidies and the decline of maize at Subinso, Mansie farmers now find they can fill a vacuum for maize on the Subinso market, and that they have a comparative advantage in that their soils can support maize production without the use of inputs. However, yam remains the most profitable crop at Mansie.

Surprisingly little research exists of the different niches that farmers occupy and the factors that define the boundaries between different farming systems. These factors tend to be overlooked by mainstream agricultural research which tends to lump different farming systems together in all-embracing categories, which sees a concept of “traditional agriculture” as all embracing in juxtaposition to agricultural modernisation. A large number of detailed monographs exist within a farming systems tradition, which provide very detailed studies of isolated farming systems, without an analysis of the way they fit into regional systems and the ways in which they accommodate or adapt to features of agricultural modernisation².

The dominant perspective in agricultural research is the systems perspective. Applied to the farming systems of Ghana, this tends to view population growth as the main motor for change, leading to a breakdown in fallowing systems and the need to replace fallowing systems with modern inputs. Older variants of agricultural modernisation stress the role of inorganic fertilisers and new crops in promoting more intensive cultivation from permanently cultivated plots. Newer variants stress the environmental damage caused by short fallow cycles, and the destruction of the environment caused by bush fallowing through slash and burn. Bush fallowing needs to be replaced, the argument goes, with more environmentally friendly technologies. Possibilities include:

- more intensive cultivation using inputs to limit the area under agricultural cultivation, to allow higher yields to be produced in smaller land areas, and enable larger areas to be preserved as forests, woodlands, and recreational areas;
- use of green manures to promote better soil recycling, improved fallowing, shorter fallowing or permanent cultivation to enable more intensive and sustainable crop production in limited areas and allow for preservation of forest and woodland areas;
- promotion of agroforestry systems to promote soil conservation, improved recycling of land and permanent cultivation in hedgerows systems such as alley cropping to enable more intensive and sustainable cropping from limited areas, preservation of trees and allow for preservation of more forests and woodlands.

The justification for the new technologies is often located in grand narratives of environmental crisis, of destruction of vegetation and soil by small-scale bush fallow cultivators, requiring new interventions and new technologies (Leach and Mearns, 1996). This is often substantiated by weak empirical data on both ecological and socio-economic dynamics. These grand narratives tend to be located in narrow commodity-focussed programmes which isolate the system components of

²One study which does deal with these parameters is that of J.Guyer (2000)

interest to the researchers from the wider setting in which the farming systems are located. While there is a growing emphasis on integrated research, socio-economic components within these commodity programmes largely focus on:

- a) soliciting feedback on farmers' experiences of the technologies under research for fine-tuning purposes
- b) understanding farmers' constraints in relation to the specific technologies of interest.

Since research does not focus on the internal dynamics of farming systems, it tends to reaffirm its own importance by seeking to present the findings of commodity programmes as the solution to complex programmes with social-economic and political dimensions. Thus, solutions to perceived problems are identified by the competence of research organisations and their linkages with international programmes and funding opportunities provided by donors.

Little research funding exists to support independent critical research. As a consequence of this, the major demonstration trials and government service recommendations concerns crops in which research services have developed a comparative advantage. These do not necessarily coincide with crops grown by farmers nor support their dominant strategies.

Mucuna trials, to cite one example of a contemporary research approach, are being developed by the extension services with the support of the GTZ programme on 'Sedentarisation of Farming Systems'. However, this programme does not present a clear overview of the potential role that *Mucuna* could play in the existing farming systems in Brong Ahafo, the classes of farmers who may be interested in *Mucuna*, the specific conditions under which *Mucuna* could be of interest to farmers, the conditions under which it would not be a suitable technology, and its potentials in the different environments, mosaics and farming systems within Brong Ahafo. Instead, the project reports portray a situation of crisis, resulting from bush fallowing and inappropriate farming systems, and this is used to justify the introduction of permanent cultivation to solve environmental and land pressure problems. Attempts to implement extension programmes around this narrative may alienate farmers attempting to rationalise investments in expensive labour in an area where land is freely available and cheap. In contrast with this narrative, it is possible that the areas which would be most receptive to *Mucuna* - and which could benefit the most from its integration into existing farming systems - may be areas in which permanent tractor-ploughing high-input agriculture was practised formerly, but where top-soils are no longer productive without the use of inputs and farmers have problems in maintaining satisfactory yields. However, the project would still need to demonstrate how farmers incorporating *Mucuna* into specific cropping cycles could effectively compete with farmers at another locality, who may be producing the same crops for the market within a bush-fallowing system with lower labour requirements.

Similarly, a *root and tuber programme* has been implemented within the Ministry of Agriculture with a research component carried out at the Crop Research Institute in Kumasi, with support from IITA. The research programme is attempting to introduce new yam varieties and recommendations, which support more intensive cultivation of yams, allow higher density of cultivation, respond positively to fertiliser, and remove the need for fallowing. Researchers are experimenting with new varieties developed by IITA. Trials are being conducted at Subinso. Attempts at continuous cultivation of yams for three years on a single plot have run into problems, including a large build up of nematodes and weeds in the soil. Attempts to increase the density of planting has resulted in the cutting of large number of yam stakes from areas outside the farm - the

project has purchased these from other farmers. Attempts to grow yams which do not require staking have not been successful. The project has focussed on cultivation of yam monocrops in a context in which the majority of farmers actually intercrop yam. The aim of introducing continuous cultivation of yam on the project is in danger of alienating farmers who can successfully produce yams within a bush-fallowing system which minimises the risk of pest, disease and weed build up.

By focussing on monocrop yam cultivation, the project does not take into account the rationalisation of labour inputs to land areas, in which cultivation may be extended for between 2-3 years by planting mixtures of yam and cassava followed by groundnuts. Attempts to develop continuous yam cultivation also have implications for the gender division of labour and allocation of old yam farms to women for groundnut cultivation. Finally, by focussing on introducing new improved yam varieties, and not taking into account farmers own adaptive experimentation in matching genotypes to environment, researchers run the risk of losing the opportunity of gaining considerable insight into farmers' own strategies.

Agricultural policy needs, therefore, to be more reflective, examining its own constraints and the unforeseen outcomes of its recommendations. This is most evident in the crisis which has beset the agricultural sector following the introduction of structural adjustment policies, and removal of subsidies and privatisation of input services. However, there has been a more general tendency for the agricultural sector to embrace new rhetorical approaches rooted in environmental concerns. The main objective is then to get farmers to change their farming techniques in order to preserve the environment. Unfortunately, this overlooks the necessity of understanding the shortcomings of approaches based on technological transfer of inputs as a precursor to developing new approaches which respond to these constraints.

Annex 3: Managing the Environment

3.1 Introduction

In recent years environmental management has acquired a high profile in Ghanaian districts. This is evident in Brong Ahafo in bye-laws regulating the use of fire on-farm and in the bush, in attempts to regulate charcoal production and to regulate hunting. It is also reflected in institutions that have developed to manage the environment including District Environmental Committees and Fire Volunteers or Fire ‘Mobisquads’. Districts have responded to pressures to implement policies, and create environmental institutions, committees and bye-laws. But these are often ill served by information systems based on empirical analysis of existing conditions within the district.

As a result, environmental policy tends to be informed by grand narratives emanating from received knowledge on the environment rather than changing conditions within the district. This encourages a top-down implementation of policy in which rural producers are considered as somewhat backward and conservative, to be cajoled into doing things in new ways rather than viewed as professionals capable of contributing new insights to knowledge. This results in the alienation of rural producers from policy frameworks, and leads them to mistrust policy processes. In contrast with this, the approach used here starts from the premise that natural resource management is concerned with a series of complex relationships between people and resources, which often interact in unforeseen ways and lead to unpredictable outcomes (Röling and Wagemakers 1998).

Knowledge and understanding can only be facilitated by creating inclusive frameworks, which allow a wide range of natural resource users to bring their understanding and perspectives to policy fora, and by creating information systems which rely on feedback from various localities.

Environmental policy should be democratic and create platforms for learning and decision-making that enable:

- (a) policy makers to gain empirical data on conditions within the district;
- (b) natural resource users the tools to:

- facilitate their understanding of their environment;
- apply a set of principles on which they agree to the management of their locally specific situation;
- to articulate their problems at policy fora to policy makers and other natural resource users.

3.2 Structures for Decentralised Environmental Policy

The Environmental Action Plan for Ghana gives a high priority to the promotion of popular participation in the planning, evaluation and implementation of environmental policies. The framework in which civil society participation in environmental management is construed is that of decentralisation.

Within the framework of decentralisation, the Environmental Protection Agency (EPA) has the mandate to facilitate the emergence of district environmental committees, and of other community level organisations such as the Fire Mobisquads or Fire Volunteers. The EPA is also responsible for developing environmental education within the districts. At the national level the EPA is responsible for drawing up national environmental plans which implement policies reflecting the international agreements and treaties to which the Ghana State is a signatory. The EPA operates at the regional level, developing regional environmental plans, coordinating the activities of the various district assemblies, and providing technical backstopping and training to enable districts to formulate bye-laws and implement policies. However, this ambitious mandate of the EPA is not matched by its resource and information base. As a result of this its policies are not prepared on the basis of an operational information system that is updated as conditions change, but by grand narratives of perceived environmental change and degradation, and received wisdom in which rural producers are frequently seen as villains, destroying the environment. A better understanding of the processes of decentralised environmental management requires an understanding of the structures and processes of decentralisation.

3.2.1 Structures of decentralisation

The framework for the current structure of decentralisation in Ghana was established by the Provisional National Defence Committee (PNDC) Law 207 of 1988. This enacted a new structure

for local government based on devolution of central government functions to 110 local districts within a three-tier structure of Regional Coordinating Councils, District Assemblies and Town Area Councils/Unit Committees. The District Assembly is the highest administrative authority in the district. It consists of elected and appointed members. Two thirds of the members are elected every four years and the other third are appointed by the president in consultation with traditional authorities and other interest groups in the area. The District Assembly is headed by a District Chief Executive who is appointed by the president. The 1992 Constitution makes the further provision that the DCE can only be appointed by the president with the prior approval of two thirds of the Assembly. The DCE can also be removed by two thirds of the Assembly passing a vote of no confidence. This is an attempt to make the DCE accountable to the Assembly. The DCE is responsible for the supervision and co-ordination of departments and organisations within the district, the executive committee and the various subcommittees. The DCE is also the link between central government and the district, conveying and explaining the programmes of central government to the people. The members of the District Assembly also elect a Presiding Member from within their ranks, who chairs Assembly meetings. The structure of the assemblies is as shown in Table 3.1.

The districts are divided into electoral areas, each of which elects an Assembly Member to the District Assembly to represent their interests at Assembly meetings. The Assembly Members participate in the meetings of the Assembly and vote to ratify policies.

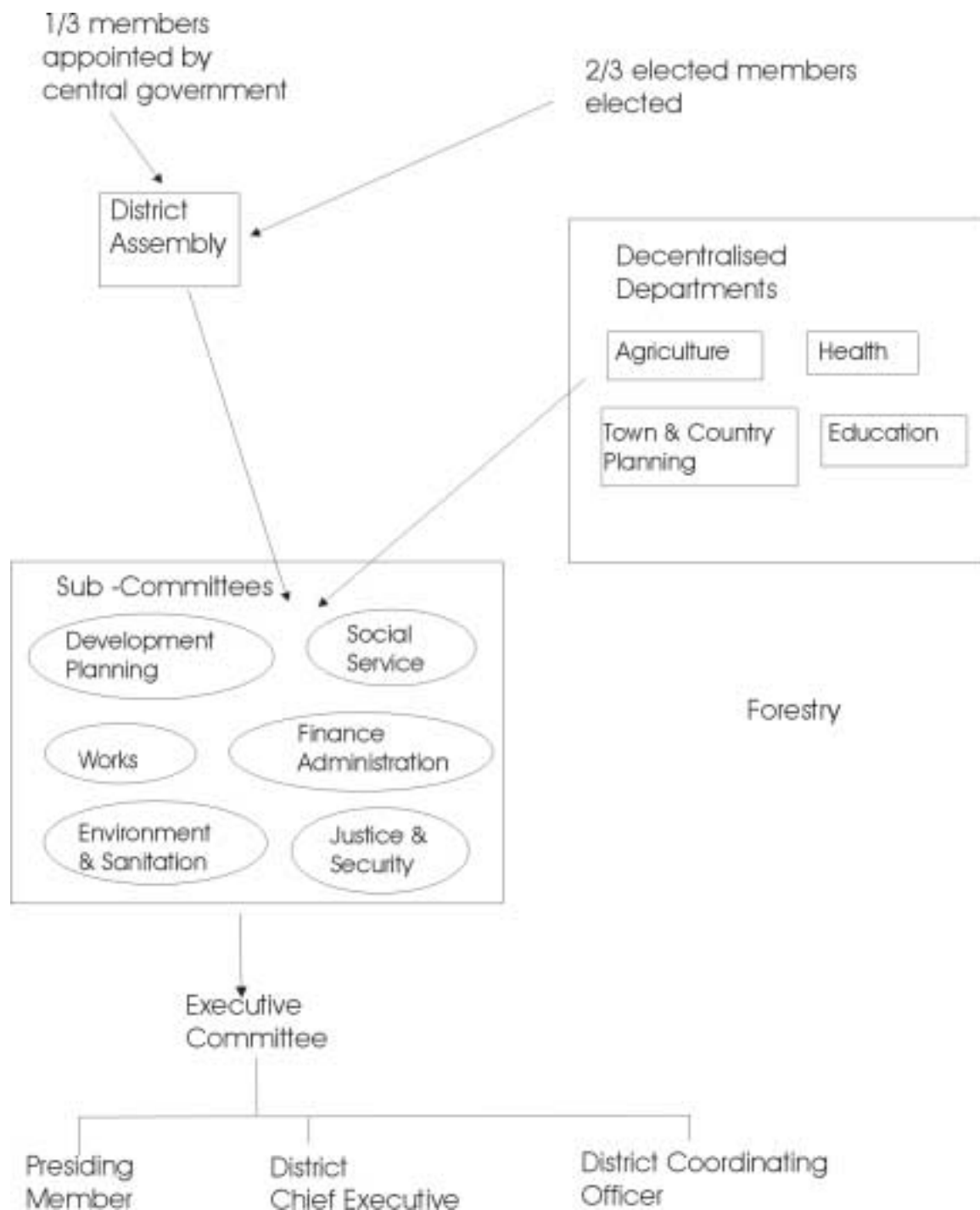
The Local Government Act of 1994 (Act 462), the National Development Planning Commission Act of 1994 and the National Development Planning (System) Act of 1994 establish the framework for development planning. The District Assemblies are empowered as the legislative body for local or district level planning to prepare district development plans. In theory these plans are to be initiated with the full participation of the local community. Under Section 3 of the National Development (System) Act it is obligatory for a district authority to conduct a public hearing on any proposed district development plan and to consider the views expressed at these hearings before the adoption of proposals as a district development plan. A local community in a district is authorised to prepare a sub-district or local action plan under the Act and is required to conduct a public hearing prior to the adoption of proposed plans.

Decentralisation also recognises the importance of devolution of resources, decision-making and tasks to democratically elected lower-level authorities that operate independently of central government. PNDC Law 207 defines the basic activities of the assembly as consisting of the following:

1. Developing a comprehensive plan for economic, social and spatial development within the district;
2. Integrating various sector plans;
3. Preparing a district development plan and annual budget;
4. Mobilising the natural, human, and financial resources within the district and protecting the environment;
5. Promoting social development and productive activities;
6. Initiating programmes for the development of basic infrastructure and provision of municipal works and services within the district.

To carry out these responsibilities, the Local Government Act of 1994 reorganises all sector departments into 12 district departments directly under the district assembly. The District Assembly comprises a four-tier organisation: the assembly, the executive committee, the sub-committees, and the sector departments.

Figure 3.1: Structure of the District Administration



The Executive Committee of the Assembly coordinates the plans of the district and recommends these integrated plans to the assembly for ratification and adoption. The sub-committees identify the economic resources and potentials of the districts, develop an information base, identify opportunities and constraints and consult with other sub-committees about integrating plans before submitting them to the Executive Committee for integration with other plans. The sub-committees consist of Assembly members and members from the various departments within the district. The various departments are responsible for implementing the plans of the assembly and participating in developing district plans.

Members of rural communities are represented at the assembly by their elected assembly person who is responsible for identifying their interests through public meetings and representing their interests at assembly meetings. The ability of rural producers to get their heartfelt issues taken up by the assembly will thus depend upon the ability of the assembly member to understand their perspectives and to represent these positions at assembly meetings. It also depends upon the ability of sub-committees to have sufficient information on these issues and an understanding of these issues. Since some of the most informed members of the sub-committees will be the directors of departments and the development officers within departments, the ability of departments to understand, analyse and represent the interests of producers will also be of prime importance. But the sub-committees should also be able to set new agendas for departments which reflect the interests of the constituents.

The Assembly Member represents the interests of electoral areas at the district level. The operational level of local government administration is represented by Unit Committees and Area Councils. The Unit Committees consist of 15 members of whom two-thirds are elected. The Unit Committees are responsible for implementing local development administration. Their main function is to organise community labour, educate the community on district bye-laws and government decrees, raise local revenues, monitor self-help projects, maintaining the environment, and keeping a registry of births and deaths. Several Unit Committees come together to form an Area Council. The Area Councils are responsible for managing local development, initiating development projects and plans, collecting local revenues, and establishing local level sub-committees. They are supposed to be the lowest level executive units with an established office

and a functioning secretariat and committees. In practice many Area Councils are as yet not fully functioning. There are many tensions between the Unit Committees and the District Assemblies, particularly over the control and allocation of scarce revenues.

Revenues have been a serious constraint in the operation of many district assemblies. Most districts have insufficient revenue to meet their development needs and to support a fully functioning process of development planning. A large number of District Assemblies have weak planning processes that lack transparency. Funds are frequently expended on constructing new offices for the district assembly, or houses for the DCE rather than expended on rural development (Crook and Manor, 1998; Ayee, 1996). This has prompted some commentators to dismiss decentralisation as a process promoting corruption. One notes, however, that lack of transparency in planning procedures is evident not only at the district level.

The Regional Coordinating Units are responsible for coordinating the plans of various districts and integrating them with national development policies and allocating to the districts public funds and grants approved by central government. They are coordinating rather than decision-making bodies.

Within the context of decentralised environmental management, the Environmental Protection Agency acts to coordinate environmental planning within the districts and integrate them with national environmental plans and international commitments. It is responsible for initiating environmental awareness campaigns, advising the district assembly on enacting environmental bye-laws, and helping to establish District and Area Council Environmental Committees. In addition to this, it is also responsible for the coordination of Anti-Bushfire Campaigns and works with the Fire Service to mobilise community level Fire Volunteer Squads.

At the District Assembly environmental issues should theoretically be discussed at Assembly meetings, and issues identified by the deliberation of assembly members based on the experiences of their electorate would be taken up by the Environmental Committee. The Environmental Committees should recommend bye-laws which would be discussed by the assembly before they were ratified. Within the settlements, the Unit Committees and the Area Councils should theoretically implement bye-laws, collect revenues from the issue of licences and permits for

natural resource extraction and revenues from crops and other produce leaving the district. They should initiate projects for the protection and enhancement of the environment. The Area Council planning process would involve meetings between the unit committees and the community.

In practice these procedures are undermined by several factors which, in their turn, undermine the establishment of democratic environmental decentralisation administered by elected representatives accountable to an electorate who participate in local level planning. These include the role of the Forestry Service in natural resource administration, the role of the Fire Volunteers, and the role of chiefs.

3.2.2 The Forestry Service and natural resource management

The decentralisation of natural resource management has been hampered by the resistance of the Ghana Forest Service (formerly, the Forestry Department) to decentralisation. The Forestry Service has argued that timber resources are national strategic resources that need to be managed for the benefit of the nation. It has argued that decentralisation of timber resources will have disastrous consequences for the sustainable management of timber and forests. It has proposed that forestry resources within the northern savanna sector (where commercial timber exploitation does not exist) can be decentralised, but not in the southern sector. It has initiated two natural resource management programmes: an experimental ‘Savanna Natural Resource Management Programme’, with community and District Assembly participation; and the highly centralised high forest ‘Natural Resource Management Programme’, without District Assembly participation. To avoid the legal obligations to reorganise as a decentralised department under District Assemblies, it has reconstituted itself as the Ghana Forest Service, a semi-autonomous civil service organisation with an independent charter.

During the 1990s forest resource management became more centralised, with the Forestry Department/Service taking over the management of off-reserve timber resources outside of concession areas. These resources were originally managed by the District Assemblies, which issued permits to chain saw operators, mortar carvers, and other wood carvers for the exploitation of individual trees. More recently, the ability of local users of timber resources to gain access to their raw material legally has been eroded with the implementation of the chainsaw ban.

The Forestry Service has also initiated its own programme of community participation in forest management with the enactment of Community Forest Committees (CFCs), which liaise between communities and the Forestry Service in the management of timber. The role of the CFCs has been defined by the Forestry Service as:

To co-ordinate consultative mechanisms on forestry issues at the community level. These can be in the areas of policy formulation, management planning, project preparation, resource regeneration and protection, and contract negotiations (Asare, 2000:6)

The CFC members are selected essentially by the Forestry Service in consultation with 'the community'. This consists of:

Representatives of all primary stakeholders who are connected with (forest) land use, community development, traditional leadership, and community organisation. The envisaged primary stakeholders that are represented are obviously the chiefs, as chieftaincy remains the key institution where land matters and local consultation is concerned. Also, farmers, the youth, women, migrants, tree planters and forest users such as hunters, herbalists and NTFP collectors are all represented. At all times, extremely close contact will be maintained with the unit committee and the assembly members through their representatives on the committee (Asare, 2000:5).

Once selected the Forestry Service provides capacity building training for the CFCs:

As a first step to building their capacity, the committees will receive training in forestry and allied subjects to enable them to perform their roles creditably. It is hoped that a Handbook for Communities on Forest Management will be prepared. The Handbook will contain all the information the CFCs need on Forest Policy, Forest Laws and Regulations, Plantation Development, NTFP harvesting rights, Timber Exploitation and so on. Additional training may also be provided in Participatory Rural Appraisal, workshop management and so forth (Asare, 2000:5).

In evaluating the performance of the pilot CFCs, Asare (2000:8) concludes:

Under the ITTO/FSD project, 13 CFCs have been established at three pilot sites in timber resource rich, medium and poor availability in Dunkwa (Diaso), Offinso, and Nkoranza.

[...] The formation process was initiated in 1998 and the committees inaugurated at the City Hotel in April 1999. Since then the CFCs have chalked immense successes in the area of seedling production and plantation establishment, prevention of illegal activities in forest reserves through arrest of offenders, monitoring of timber operations of TUC holders and the mounting of educational campaigns on forestry issues to community members. Some of the CFCs have secured authorisation to mount roadblocks to check illegal chain-sawing activities. This has resulted in the lowering of illegal operations in those areas where CFCs are operating (2000: 8).

From the above it is evident that the CFCs have been created primarily to meet the objectives of the Forestry Service in managing forest reserves, maintaining the monopoly position of the timber industry, bolstering the claims of chiefs over timber resources, policing timber resources, and promoting plantation development. The CFCs do not strengthen civil society participation in natural resource management to any significant extent, since they do not promote debate on local needs and interests in natural resource management. Furthermore, they undermine the role of district decentralisation in natural resource management, and any concept of electoral democracy and accountability. The function of community participation is essentially to meet the narrow technocratic needs of the forestry service.

3.2.3 The Fire Volunteers and natural resource management

Following the 1983 bushfires, a National Anti-Bushfire Committee (NABFC) was set up, to be coordinated by the Environmental Protection Council. The NABFC made recommendations for the setting-up of Fire Volunteer Squads in every village. The Fire Service was made responsible for their training. Training consists of military drills and rudimentary fire fighting techniques. The Fire Volunteers have the mandate to fight fires in their villages and also to prevent the outbreak of fire by implementing bye-laws regulating the use of fire. These regulations restrict use of fire in hunting, by palm-wine tappers during the dry season, the cooking of food on farm during the dry season, and the burning of farm slash during the clearing season. Bye-laws require that the burning of farm slash is supervised by a fire volunteer. Many of the Fire Volunteer Squads have extended their power to include monitoring other environmental bye-laws, including the restriction of cultivation in the immediate vicinity of streams. In some areas, such as the Nsawkaw area

council, their mandate includes monitoring charcoal production. People who contravene the bye-law can be reported to the chiefs or police for arrest and prosecution by the Fire Services.

While the outbreak of fires is of concern to the rural community, farmers have developed skills in controlling them and preventing fire spreading to their farms. Many farmers create firebreaks around their farms. Some farmers take their time over burning, burning small portions of the farm in a controlled method which prevents the fire getting out of hand. Within the northern parkland zone many farmers develop techniques of early burning, or weeding at the onset of the dry season, to prevent the spread of fire. Yam farms are often cleared from September onwards, effectively checking the spread of fire into the next season's farm. The fire volunteers simply do not have the skills and knowledge of the farmers in controlling fire.

The Fire Volunteer Squads usually consists of youths who are willing to undertake the training by the Fire Service as part of a community fire fighting group. They charge the farmers a fee for supervising the burning of their farm plot. At Buoku, in early 2002, fire volunteers were charging farmers ₦20,000 for supervising the burning of the plots, while the bye-laws of the Wenchi Traditional Area against bush fires recommend ₦5,000 for farms up to 5 acres and ₦10,000 for larger farms. These are considerable sums for farmers (compare, for example, the fact that an acre of land can be rented for one year at Subinso for between ₦20,000-40,000).

Since there are no clearly defined checks and balances on the Fire Volunteers or system of accountability, the regulation of fire can easily degenerate into rent-seeking activity. Given the large number of farms in any locality, the feasibility of fire volunteers supervising the burning of rubble of every farm is highly unlikely. In some settlements large numbers of people join the fire volunteers to make sure they can evade payment of supervision fees for bush clearance and cover their family members. Ultimately, the present organisational structure of fire volunteers can send negative messages that environmental management constitutes another politically organised rent seeking activity.

3.2.4 Chiefs and natural resource management

Chiefs are playing increasingly important roles in natural resource management. Their authority emanates from their claims to ultimate ownership of the land and rights to establish customary bye-laws over usage of the land. Apart from having rights to gain fees from migrants exploiting natural resources in their domains, chiefs are increasingly being empowered to enact environmental bye-laws and fine transgressors. In 2001 the Brong Ahafo Regional Co-ordinating Council has proposed a new bye-law which will hold the traditional authorities responsible for the outbreak of bush fires in their areas. Traditional authorities are now busy enacting bye-laws to control bush-fires.

The bye-law enacted by the Wenchi Traditional Authority on 25th October 2001 recommends that every village under Wenchi Traditional Authority should set up an Anti-Bush Fire Volunteer Squad and that there should be no bush burning between 1st December and 31st March each year. Among the causes of bush fires it identifies “recalcitrant farmers who insist on burning their new farms at the wrong time”. The bye-law establishes the fine for burning a farm without the supervision of Fire Volunteers as ₵500,000.

3.2.5 District Chief Co-ordinating Executives and Natural Resource Management

The DCE is an appointed official of the government whose main role is to present the government’s development policy to the District and ensure that the District Development Policy reflects government policy. The DCEs are thus accountable to government rather than to the district electorate, although they can be removed by a vote of confidence of two thirds of the assembly. In environmental policy, the role of the DCE is to present the government’s environmental policy and to ensure that it is implemented within the district. This tends to reinforce a top-down approach, which is more concerned with ensuring that the population of the district adheres to national policy than that national policy is informed by the needs of the electorate of the district.

3.2.6 The role of Assembly Members and Unit Committees in Natural Resource Management

Within the prevailing structures of current district administration it would be difficult for Assembly members or Unit Committees to question environmental policy or to seek to adapt it to

the needs of their constituencies. Environmental policy tends to be transmitted to the Districts as a set of prescriptions which Assembly Members and Unit Committees are required to implement. For instance, the Bye-Laws against Bush Fires enacted by the Wenchi Traditional Area with sanction from the Regional Co-ordinating Council require the Unit Committees and 'Assemblyman', alongside the chief of the village, the chief hunter, and 'a woman' (unspecified) to set up a committee to supervise Fire Volunteers in implementing the bye-laws. There are no provisions for Assembly Members and Unit Committees to set up a consultative community fora to examine the problem of fire and devise suitable solutions. There are also few avenues through which Assembly Members and Unit Committees can get access to dispassionate information on the environment, since most information is disseminated to the districts in a rhetorical and prescriptive form defining a series of necessary actions which need to be taken to preserve the environment and regulate its utilisation by the rural population.

Given these constraints the main options open to Assembly Members and Unit Committees are to:

1. act as spokespersons for government environmental policy and advocate the relentless implementation of bye-laws at the risk of unpopularity and future electoral failure;

OR:

2. ignore environmental policy and implement it half-heartedly;

OR:

3. take advantage of the considerable confusion, conflicting responsibilities of different authorities and lack of accountability to community organisations to engage in rent-seeking behaviour.

Linkages and consultation mechanisms to bring together Assembly Members, Unit Committees and the rural inhabitants are poorly developed. In the survey of farmers, 54 percent of the respondents claimed that they did not attend meetings with the Assembly Member or Unit Committee and 79 percent felt that the Assembly Member and Unit Committee did not perform useful development functions.

Of the 21 percent who felt the Assembly Member and Unit Committee were of some help, the overwhelming majority (17 percent of respondents) saw their role as the provision of social services. Other useful functions ascribed included the re-gravelling of roads (two percent),

promulgation of bye-laws (one percent), and controlling charcoal burning (one percent). A significantly larger percent of women than men did not attend meetings called by the Assembly Member or Unit Committee. Sixty-one percent of women did not attend Unit Committee meetings as compared to 48 percent of men and 86 percent of women felt the Unit Committee and Assembly Members were of no use, as compared to 66 percent of men. Several women complained that Unit Committee meetings were for men or that the Unit Committees called meetings in the evening at precisely the time when they had to cook the evening meal for their families. Women are poorly represented in the District Assembly. In the Wenchi District only two Assembly Members are women. In a survey of the composition of 55 Unit Committees in the Wenchi district carried out by the research team, only 113 (17 percent) of 663 members were women.

Seventy-eight percent of all migrants, as compared to 82 percent of indigenes, felt that the Assembly Members and Unit Committee did not perform useful functions. However, ninety percent of migrants for the Upper West Region (the dominant category of migrants with 49 represented in the sample) felt the Assembly Member and Unit Committee were of no help. A larger proportion of migrants than indigenes claimed to attend Unit Committee meetings - 53 percent of migrants said they attended these meetings as compared to 41 percent of indigenes. (However, only 41 percent of the dominant category of migrants, from the Upper West Region, said they attended the meetings.) In the survey of Unit Committees, only 12 percent of the members were migrants, of which 45 percent originated from the Upper West Region.

Most Unit Committee members are farmers. In the survey of Unit Committees, 81 percent of Unit Committee members identified themselves as farmers. In terms of their educational background, 37 percent had no formal education, 5 percent had primary education and the remaining 50 percent had progressed to middle or secondary school. Of the 35 Assembly Members interviewed in the Wenchi District 97 percent originated from the Brong Ahafo District, of which 92 percent classified themselves as local. The other 3 percent originated from the Upper West Regions. The largest proportion of Assembly men were teachers, who made up 49 percent, as compared to 26 percent who were farmers, 6 percent traders, 3 percent civil servants and 17 percent consisted of other miscellaneous occupations.

Given the poor linkages between rural dwellers and their representatives in district administration it is not surprising that environmental policies are poorly implemented and are frequently given low priorities. The majority of Area Councils do not have environmental committees and many communities, particularly in the northern transition zone, do not have functioning Fire Volunteers.

A second outcome of these poor linkages is that the prescriptive framework for environmental management with its emphasis on blame and lack of empirical justification, and the weak articulation of structures of local natural resource administration, tend to be manipulated within communities by different political interests in struggles to gain control or access to resources. This is evident in conflicts over charcoal management.

3.3 Charcoal Management Issues

In 1995, several district assemblies in Brong Ahafo introduced bans on charcoal production or the export of charcoal out of the district (Jongkind 1996). This was fuelled by heightened international and national concerns about environmental degradation following the earth summit, but also local concerns about the control of charcoal production by migrants. This contributed to “increasing feeling by indigenous groups of irresponsible exploitation by the present producers” (Jongkind, 1996).

3.3.1 Social organisation of charcoal production

The main producers of charcoal in the transition zone are Sisala migrants from the Upper West Region, who have organised the system of production and marketing from the rural areas to the large urban centres. The Sisala usually negotiate rights to exploit charcoal from local chiefs. The main trees they favour for charcoal include *Anogeissus leiocarpa*, *Terminalia glaucescens*, *Pterocarpus erinaceus*, and *Lophira lanceolata*. The main environments in which charcoal burners operate are parklands. The trees which are most suitable for charcoal are those which have some degree of fire resistance and burn slowly. Charcoal burners prefer to extract charcoal from dead trees since live trees have to be dried before they can burn. They also pay revenues to the district assembly, levied on every bag of charcoal transported beyond revenue collecting points in the district. Charcoal is the third most important source of revenue for the Wenchi District Assembly (See Table 3.1).

Table 3.1 Revenues of the Wenchi District Assembly for 2000

Source of Revenue	Amount (cedis)
Farm produce	58,740,280.00
Market fees	57,708,270.00
Charcoal	36,974,800.00
Property Rate	27,395,077.00
Lorry Parks	14,986,900.00
Basic Rates	7,673,700.00
Self Employed Artisans	5,940,000.00
Stool Lands	5,400,000.00
Unvalued Property	4,422,520.00
Beer, Spirits & minerals	4,061,500.00
Plot Approval / Building Permits	3,571,000.00
Entertainment Fees	3,077,450.00
Traders	2,955,700.00
Stores, Sheds & stalls	2,504,400.00
Lumber Dealers	2,103,500.00
Restrained Animal fees	1,815,000.00
Sand & Stone contractors	1,636,000.00
Herbalist & physicians	1,429,000.00
Royalties	1,410,650.00
Undeveloped Property	1,193,500.00
Corn & Flour Mills	1,142,300.00
Slaughter of Animals	861,200.00
District weekly Lotto	857,500.00
Day care Centres	832,000.00
Contractors	821,000.00
Bush Meat	300,000.00

Source: Wenchi District Assembly

The Sisala charcoal burners are socially differentiated. The wealthiest have access to lorries to transport charcoal to urban markets and also purchase charcoal from smaller producers. The poorest charcoal burners cannot afford to gain rights to trees or to purchase sacks in which to

transport the charcoal. They either work on contract for larger charcoal producers or gain loans from traders which they pay back in charcoal.

Before the mid-1990s, charcoal burners gained permits from the chief and were able to extract charcoal freely within the political domain of the chief, from the fallow lands of farmers. By the mid-1990s there were increasing conflicts between farmers, youth and migrant charcoal burners and many charcoal burners were expelled from communities by farmers who claimed they were destroying the environment. This was mainly in yam producing areas, where the main trees considered suitable for charcoal occur. The farmers allege that as a result of charcoal burning large numbers of trees are being cleared from their land, and this has an adverse effect on yam cultivation. They also allege that yam cultivation does not do well in the areas of land on which charcoal is burned.

3.3.2 Case studies of charcoal production

With the development of a national environmental discourse responding to international concerns and pressures on district assemblies to develop environmental policies, farming communities and assembly members began to redirect the environmental discourse against Sisala charcoal burners, chasing them out of their communities. They were emboldened by bye-laws of district assemblies banning charcoal production. However, this has not necessarily led to diminished charcoal production. In many cases charcoal production has in fact expanded, with local youth replacing the migrant Sisala as the main charcoal burners. This is the case at Mansie, where charcoal burning is now the mainstay of youth, who originally studied the techniques of burning from Sisala charcoal burners and then chased them out of the settlement before taking over the industry.

At Weila, the process of local take-over of charcoal burning has occurred over the last two years and can be documented. In the first stage the chief of Weila granted permission for migrant charcoal burners to operate in fallow lands in return for a fee. The youth in Weila began to study the charcoal-making process. In the second stage farmers began to complain of the damage done to fallow land by charcoal burners and local youth began to produce charcoal. In the third stage, following the attempts of the Kintampo district assembly to ban charcoal, farmers and youth began to demand that charcoal production should be regulated. The chief was pressurised into creating

local bye-laws to regulate charcoal production. This prevented charcoal burners from exploiting live trees and limited charcoal burning to trees cleared on farm plots. On yam farms these trees are processed into charcoal after the yams had been harvested and the trees used as stakes. On maize and other food plots the trees are processed into charcoal before planting. The charcoal burners now had to pay the farmers a fee for exploiting the tree resources on their farm, and the migrant charcoal burners had to compete with local charcoal burners who could gain favoured access to land from farmers who were their own relatives, and who could also clear land to make farms in their own right. Frustrated, the Sisala charcoal burners decided to move on to other localities and local youth gained control over charcoal resources. However, in the process the chief lost access to the revenues he gained from granting rights to migrant charcoal burners and cannot levy local youth since as citizens they can claim rights to farmland and natural resources. The chiefs and elders allege that the youth are cutting charcoal from green wood in the bush and vow to make sure that the youth are brought to heel and obey the bye-laws.

In the Nsawkaw area, a slightly different outcome has occurred. Our story begins in a familiar way. Sisala charcoal burners move into the well wooded environs of Nsawkaw and negotiate rights to exploit trees for charcoal with the paramount chief of Nsawkaw and other chiefs in the villages in which they work. Farmers begin to complain about the exploitation of charcoal on their fallow land and its negative impact on the environment. This is taken up by an assembly member who is prominent in the district environmental sub-committee. He is instrumental in organising a district environmental committee with assistance from the regional EPA and in organising the fire volunteers. He is hostile to charcoal production and to Sisala charcoal production. The EPA and Fire Volunteers become involved in regulating charcoal production and ensuring that charcoal is only produced from dead wood on cleared farms.

Conflicts emerge over charcoal production. Some migrant charcoal burners allege that some farmers sell dead trees on the farm to charcoal burners. When the charcoal burner has finished processing the charcoal a relative of the first farmer will claim that the land belongs to him and will seize the charcoal and refuse to release it until the charcoal burner has paid him off. Other charcoal burners complained that members of the Fire Volunteers and the Unit Committee seize charcoal which they have processed from dead farm wood and claim that the charcoal has been

produced from live trees off-farm. This pretence is maintained until the charcoal burner pays them off. Other charcoal burners narrate how some indigenes release land to Dagaaba farmers with the intention of exploiting the land for charcoal. When the Dagaaba farmers have cleared the land the indigenous landowner then sells the cut trees to charcoal burners as dead farm wood. The value of the charcoal is far higher than rent for agricultural land.

With increasing conflicts over charcoal, rival centres for judging the cases developed. Some charcoal burners preferred to take the case to the chiefs and elders with whom they originally negotiated for land on which to exploit charcoal. The Unit Committees in Nsawkaw refused to recognise the authority of the chief and elders to judge cases over charcoal, arguing that this is the mandate of the Environmental Committee. They refused to participate with the chiefs in negotiating these cases, arguing that the chiefs are illiterate. The dispute flared up into a confrontation between youth led by the environmental committee, and the paramount chief. The paramount chief was forced to leave Nsawkaw town. The chief reports to the DCE that the Assembly Member encouraged the youth of the town to be insubordinate. The DCE reprimanded the Assembly Member, who also moved out of the town to Wenchi, and the activities of the Environmental Committee were suspended.

The monitoring of charcoal production now came under the Fire Volunteers. Gradually tempers cooled down and the youth become more conciliatory. The farmers tempered their aversion to charcoal production by becoming more accommodating. They now recognise that their brothers and sisters in the urban areas need charcoal with which to cook the food they purchase from them. They recognise that you cannot farm without cutting trees. They realise they are getting useful incomes from selling trees to Sisala charcoal burners, and Nsawkaw has become a major charcoal producing centre. Some of the youth have tried their hand at charcoal burning, but it is not as easy work as they thought it would be. There is a gradual recognition that the charcoal burners are providing opportunities for farmers to gain useful supplementary incomes.

New institutional innovations may develop to make charcoal production more sustainable. In some instances farmers and charcoal burners negotiate and plan charcoal extraction before the start of the farming system. The charcoal burners will inspect the area the farmer intends to clear, and

negotiate for trees they are interested in burning. The charcoal burner will arrange for a chainsaw operator to come in and fell the trees. In yam farms, the charcoal burner will wait for the end of the yam harvest before burning charcoal. At Njau and Tanoso an arrangement has been worked out whereby a fire volunteer from the other settlement (that is to say, a fire volunteer from Tanoso in Njau, and *vice-versa*) will inspect the trees which charcoal burners intend to exploit and certify that they are dead wood. Gradually more transparent structures and institutions for negotiation are coming into being within a situation of simmering conflicts.

At Nsawkaw some charcoal burners estimated that they pay the traditional authorities ₪60,000 per annum for rights to exploit charcoal. In addition they pay farmers from ₪200,000-₪2 million for rights to exploit dead farm trees depending on the potential value of charcoal exploitation from the farm. They pay the District a levy of ₪1,000 on every bag of charcoal produced and the Traditional Council ₪100 on every bag of charcoal processed. Negotiating bodies are evolving from the community level, and from an implicit understanding of the value of charcoal, rather than from the higher echelons. These latter (the District Assembly Environmental Committees and the regional and national structures of environmental management) are still rooted in grand narratives of impending crisis narratives and environmental destruction by rural producers.

Networks of farmers and charcoal burners would have been better served by structures which would have facilitated negotiation in the first place. However, these options were not open to farmers whose rights to charcoal production were not originally recognised. Through these various strategic machinations and intrigues farmers have been able to gain rights to sell trees on their farms to charcoal producers. These struggles have ultimately targeted chiefs as much as they have charcoal burners. Once farmers win rights to sell trees they can become accommodating. However, some chiefs may also respond by becoming vindictive, as perhaps is the case at Weila, pursuing environmental management as a way of continuing a struggle with the youth over control over charcoal revenues.

Given the high value of charcoal resources to the transition zone district assemblies, it is surprising that they have not evolved structures to promote more sustainable production of charcoal. The extent of the charcoal resources within the transition zone districts remains largely unknown, as

does the extent of their depletion. The present level of exploitation, the optimal level of exploitation and the trends in timber exploitation remain in the realm of conjecture (Adjei Sakyi, 1997). In place of a dispassionate assessment of the trends in charcoal production, or the creation of an institutional structure for collecting information on charcoal exploitation, and the opening of debate on improved charcoal management among different stakeholders and interest groups within the district, the regulatory structures of district administration are justified by a moral rhetoric.

Appendix to Annex 3: Local Government Reform in Ghana

a) Origins and progress of decentralisation in Ghana

Origins of decentralisation

The present structure of decentralised local government in Ghana has its roots in the crisis of the late 1960s and 1970s, and the changes brought about in response to the political decline by the PNDC.

The British colonial model of local government was heavily dependent on the intermediary role of traditional chieftaincies. These were given a central place in local government, particularly in mobilising communal labour. Local government reforms were introduced in 1951, which provided for district and local committees, two-thirds elected and one-third appointed by the chiefs. Following decolonisation in 1957, a system of fully elective district administration was introduced. However, first under Nkrumah's CPP administration, and then under subsequent military and civilian administrations, local government became subordinated to the needs of the central government, to the detriment of the citizenry (Amanor and Annan, 1999). Throughout the period of independence, local authorities and the stool chieftaincies have been played off against each other, by successive governments, none of which have ever had sufficient power to risk creating a genuinely representative and independent tier of representative local government. Fear of regional and/or ethnic separatism has also conditioned the response, and caused governments to hold back from any substantial shift in political authority (Haynes, 1991).

During the CPP period, the chiefs were seen as the main threat to modernisation, and town and development committees were used to counter their power. These were kept firmly under the control of the CPP-appointed district commissioners, however. With the overthrow of Nkrumah in the military coup of 1966, power shifted back to the chiefs, and the district committees declined in power. Nine Regional Councils were created, with primary development planning roles. The Busia government (1969-71), although initially critical of the centralist approaches of its predecessors, subsequently reinforced this tendency. Both Regional Chief Executives and Chairmen of the District Councils were appointed by the central government. The National Redemption Council (NRC) which took power in the coup of 1971 likewise failed to honour its commitments to devolution. Neither of the two elective levels promised in its programme of local government reform (local and regional councils, which were to be located, respectively, above and below the district level) was ever created. District Councils formed the main vehicle for local administration, but these were relatively large (there were 65 of them, with authority over populations of between 150,000 and 240,000). Central government retained control over most development processes, and public disillusionment with local government was only reinforced. Only 18% of the electorate turned out in the 1978 district elections. (Haynes, 1991)

The 1979 uprising of junior officers began to put in place a new structure of mass mobilisation, and this was consolidated and extended when, following a brief democratic interlude, the Provisional National Defence Committee (PNDC) came to power on 31 December 1981. Following dissolution of the district councils which had been elected in

1978, the PNDC formed People's Defence Committees (PDCs) to act as vigilante organisations against corruption and profiteering. These also became involved in community development. District Secretaries were appointed in 1983, and these were responsible for nominating management committees to replace the formerly elected councillors. The PDCs were subsequently transformed into Committees for the Defence of the Revolution (CDRs), whose main functions were community development, information dissemination, education and arbitration in inter-community disputes (Ibid). The aims at this stage were to legitimise a regime sorely in need of an alternative power base, and to compensate for its impoverishment and lack of resources for development. The PNDC's pamphlet '*Decentralization in Ghana*' (1983) stated that the purposes of decentralisation were:

- To increase initiative and development at the sub-national level;
- To reduce the urban/rural divide;
- To end the drift away from the countryside. (Haynes, 1991:289)

Notably, however, the intention was only to decentralise administrative - not political - authority (Haynes, 1991; Amanor and Annan, 1999). No political roles were accorded to the local level, and the PNDC ensured that no local political opposition was permitted to emerge.

With the return to civilian rule and democratic government at national level in 1992, the District Assembly system was retained. Also retained was the prohibition on involvement of national political parties in district level elections. These were to be held on a purely local basis, with candidates standing as individuals without any party affiliations

Structure of decentralised local government

In 1987, the government announced a new programme intended to decentralise and democratise the administrative structure. Section Six of PNDC Law 207 gave both legislative and executive functions to a new institution of district assemblies, which were to replace the former PDCs.

The central features of this section of the Law included (Ayee, 1996):

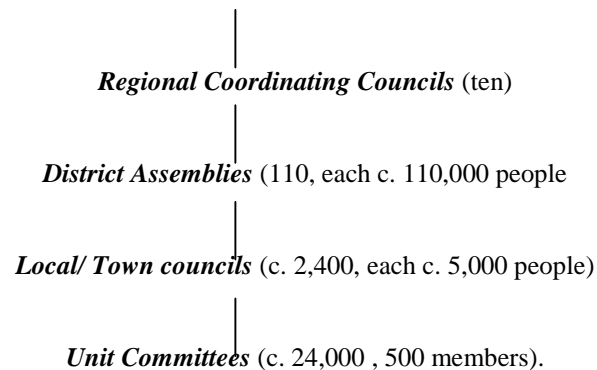
- An increase in the number of districts from 65 to 110 (with 107 District Assemblies and 3 major Metropolitan Assemblies);
- First-past-the-post elections to be held in late 1998/early 1999 for two-thirds elective membership, at the start of a four-year electoral cycle;
- Nomination of the remaining one-third (by the PNDC, after consulting with the traditional authorities and other district-level interest groups);
- The deconcentration of government departments to district authority;
- Creation of District Development, Planning and Budgeting Units, and District Planning and Budgeting Officers';
- The ceding of certain revenue sources to the district assembly level, and certain other financial transfers from the central government, on a delegated basis;
- Some degree of decentralisation of contracts and tenders.

Crook and Manor characterise the Ghana model of decentralisation as of a ‘mixed’ or ‘fused’ type – ie. the district assemblies were conceived as forming part of a “single, integrated hierarchy of government administration from local to national levels.” (1998: 207) They represent an amalgam of the traditional district administration, under the authority of the central government, with a more genuinely devolved local government, with its own democratic controls, services, and tax-raising powers.

The overall structure is as follows:

STRUCTURE OF LOCAL GOVERNMENT IN GHANA, FROM 1988 (Haynes, 1991, 292)

Supreme Body (initially, PNDC)



Each District Assembly was headed by a District Secretary (later named District Chief Executive), to be appointed by the President. From 1992, a requirement of approval of any presidential nominee by two thirds of the Assembly was also introduced. By the same token, a two-thirds majority would be needed for a vote of no confidence. The DCE is assisted by a career civil servant, the District Administrative Officer (later, District Coordinating Director. However, the day to day administration of the district was - and still remains - in the hands of an elected Executive Committee, comprising not more than one-third of the total elected Assembly, which are responsible for its executive and coordinating functions. (Crook and Manor, 1998, 234)

Thus ‘accountable’ to the Assembly, the DCE is responsible for the supervision of the executive departments of the district, as well as the executive committee and various subcommittees. Assembly meetings are, however, presided over by an elected Presiding Member.

The District Assembly was primarily conceived as a district planning authority (Botchie, 2000, 25), to be responsible for:

- Comprehensive economic, social and spatial development plans;

- Integrating sector plans;
- Mobilising the resources of the district and protecting its environment;
- Promoting social development and productive activities;
- Provision of municipal works and services and developing basic infrastructure.

The 1993 Local Government Act organised all 22 sectors, which had been devolved to the local level, into 12 departments incorporated under the unitary authority of the Assembly. (Crook and Manor, 1998, 205)

District Assemblies have a number of statutory environmental functions (particularly brown issues such as sanitation, water and pollution). There is presently no requirement for Assemblies to convene environmental sub-committees. Only five sub-committees are statutory at Assembly level. These are for Development planning, Works, Social Services, Justice and Security, and Finance and Administration (Local Government Act 462, Para 24). However, DAs are at liberty to create other specialist sub-committees, and District Environmental Sub-committees (DESCs) are among the most common.

Like the DAs, the Unit Committees comprise elected and appointed members in the ratio 2:1 (ten elected, and five appointed). The Assembly members are ex-officio members of the Unit Committees in their respective areas, and act as an important link between the two levels. (Botchie, 2000, 41) Only since 1997-8, has this lower-level structure been close to fully operational, with the holding of many of the Unit Committee elections.

Problems with implementation

This research report will examine the implementation of decentralisation in the districts of the study, with particular references to its environmental consequences. Here, we review the literature on Ghana's decentralisation in more general terms, identifying the main constraints on its implementation to date.

A number of studies exist on this theme, of which the major for our purposes are: Haynes (1991); Ayee (1996); Mohan (1996); Crook and Manor, 1998; Amanor and Annan (1999); and Botchie (2000).

Amanor and Annan identify a number of areas in which major problems have arisen, of which three merit particular mention:

- i. Problems in integrating decentralised departments into district assembly structures and decision-making processes;
- ii. Lack of skilled personnel;
- iii. Lack of a sound financial base;

i. Problems of integration.

From the start, the district assemblies have suffered from the failure of the central government to fully implement its decentralisation policies, in both their administrative and fiscal aspects. 22 departments were intended to be decentralised. Only the Forestry Department (now the Ghana Forest Service) was to retain its national status, albeit only in the southern regions, in recognition of the strategic importance of its moist forests to the economy. However, the staff of the departments which were decentralised still depend on their national ministries for budgets, salaries, promotion and conditions of service, and their loyalties were thus divided between Accra and the district. In a partial attempt to rectify this problem of divided loyalties, budgets are to be devolved to district level, and placed under the control of the Assembly. However, while the Local Government Act was passed into law in 1993, the associated Local Government Services Bill has still not been enacted.

Plans for the election of all members of the District Assembly, and for the appointment of the District Chief Executives to be fully subordinated to the will of the Assembly, also remain on the drawing board.

ii. ***Lack of skilled personnel***

A further problem which has arisen concerns the administrative capacity at the district level. While the national appointees to district-level posts (particularly the District Coordinating Officer) retain their national status, under the auspices of the Civil Service Commission, there is no equivalent national service at district level, and thus district staff are limited in their ambitions and career prospects. There have been calls for the creation of a national-level 'Local Government Service', with district cadres able to circulate in all 110 districts, but as yet, this has not materialised.

One consequence of this is an extreme shortage of qualified technical staff to serve the district assemblies. The following table summarises the situation as of 1997 as regards the primary district function (development planning) on a national basis (Botchie, 2000:37):

N ^o . of district planning officers per district	N ^o . of districts reporting	Percentage
4	2	1.8
3	2	1.8
2	41	37.3
1	48	43.6
0	17	15.5
Totals:	110	100

Source: MLGRD (HR Division) records, 1997.

The Brong-Ahafo Region is among the better endowed, as illustrated by the following figures:

Brong-Ahafo Region	N ^o . of Districts in the region	N ^o . of district planning officers per district	N ^o . of districts reporting
	13	4	1
		3	1
		2	5
		1	5
		0	2
Total N ^o . planning officers			

(13 districts) = 22

By contrast, the Upper East Region, with six districts, has only two planning officers in all. Even the well-placed Central Region, with 12 districts, has only 12 planning officers, with four of its districts having no one at post at all. Consideration needs also to be given to retention of staff. For example, in 2000, the Ashanti Region lost a quarter of its planning officers (9 out of a total of about 34), mostly, it is said, to NGOs able to pay much higher salaries than the state.

Low technical capacity within the district-level civil service is compounded by low capacity within the elected assemblies. Though the local elites are disproportionately represented, elected assembly members often have relatively little formal education, and are easily intimidated by the appointees and professional staff. Local participation is therefore low, and planning has only limited relevance to local needs. (Amanor and Annan, 1999, 13)

iii. Lack of a sound financial base

Districts have five primary sources of revenue (Botchie, 2000, 31-2):

- a) *Central government transfers*, the main of which are the salaries of centrally paid DA staff, and the 'District Assembly Common Fund' (DACF). This is calculated on a revenue formula based on a combination of an agreed minimum payment to all districts, supplemented by a population factor and a development status factor relating to access to public services in the principle town, with an additional 'responsiveness' component to motivate the districts to increase their local revenue generation. The DACF is fixed, under the Constitution, as not less than 5% of total revenues of the state.
- b) Ceded revenues, being the total of revenues collected by the Internal Revenue Service on behalf of the DAs (as a share of taxes on income, ceded revenue comprised only 1.5% in the period 1993-5).
- c) Traditional district level revenues such as the basic rate (poll tax), property taxes, and others, to be fixed by the Assembly itself, as well as licences (alcohol sales, hawkers, etc.) and fees such as market tolls and crop levies (for exports across the district boundary).
- d) External assistance from donor agencies, including NGOs; these are mostly for development projects in areas such as health, education, water and sanitation, poverty reduction, and agriculture and micro-projects.
- e) Other locally-generated revenues, such as (where applicable) mining and timber royalties.

Expenditure of the DACF is controlled by the central government , currently being allocated as follows:

Allocation:	Percentage
'Development' (education, health, agriculture)	50
Sanitation vehicle purchase	5
Capacity building	2
Rural electrification	3
Poverty alleviation	20
Self-help projects	10
Housing	5
Disaster management	5

[all after deduction of 10% reserve]

As this table indicates, education, health and agriculture are regarded as the ‘main stakeholders’ of decentralisation; these have generally been the most reluctant to decentralise. Locally-generated revenues can be dispensed as the district wishes, subject to operation of its democratic procedures.

The DACF is the major fund available to most districts. The amounts allocated to the districts vary considerably from year to year (with 2000 being a particularly difficult year), as the following table indicates:

DISTRICT ASSEMBLIES COMMON FUND

Districts Allocations (1994-2000)

(in millions of cedis, rounded to nearest ‘00,000)

Region:	1994	1995	1996	1997	1998	1999	2000
Western	3,500	5,300	9,500	12,900	12,400	14,100	4,800
Central	3,700	5,700	7,600	9,100	13,000	15,000	5,000
Greater Accra	3,600	5,500	7,800	9,300	10,300	12,600	3,600
Eastern	4,900	7,400	9,600	11,300	15,600	16,800	6,000
Volta	3,700	5,600	6,900	7,800	11,400	12,600	4,300
Brong-Ahafo	3,700	5,700	7,800	9,300	12,600	13,800	4,900
Ashanti	6,400	9,800	14,100	16,600	21,700	24,300	8,300
Northern	3,300	5,000	7,300	9,000	13,000	16,300	6,000
Upper West	2,000	2,600	3,700	4,200	6,000	7,000	2,700
Upper East	1,700	2,600	3,700	4,200	5,900	7,000	2,700

Most district assemblies are seriously constrained financially. This relates to two main problems. Firstly, there is a problem of inadequate funding; the district allocations are generally insufficient to the tasks in hand, on top of which there is no guarantee that the sums in question will actually be received into the district accounts. And secondly, Assembly members are often reluctant to exploit to the full their local revenue generating powers. The problems here are largely political. Writing of their case studies in two districts (East Akim and Mamprusi) in the early 1990s, Crook and Manor see the dilemma thus:

“The principle of community-based self-help did not fit easily with the institution of representative district government, in so far as it undermined the legitimacy of district taxation and raised irreconcilable differences in the procedure for allocating very limited resources. ... elected members found it hard to justify the legitimacy of district taxation when their only argument was that the community would receive a direct return on its contribution.

For most members, this implied link could never be demonstrated....” (1998,266)

Summing up Ghana’s experience, Crook and Manor identify a number of problems which have to be addressed in any situation of decentralisation. Firstly, that accountability to elected officers can only work where autonomy is granted in the management of resources. Secondly, that the need to ensure effective management, and also to contain its costs, require that central government should be modest in its ambitions for decentralisation. In the Ghana case, these authors

argue, the reforms are probably much too radical. This is the case both in terms of the number of sectors to be coordinated, and the numbers of assemblies created for the purpose. (1998, 269-270)

Appendix to Annex 3: Local Government Reform in Ghana

a) Origins and progress of decentralisation in Ghana

Origins of decentralisation

The present structure of decentralised local government in Ghana has its roots in the crisis of the late 1960s and 1970s, and the changes brought about in response to the political decline by the PNDC.

The British colonial model of local government was heavily dependent on the intermediary role of traditional chieftaincies. These were given a central place in local government, particularly in mobilising communal labour. Local government reforms were introduced in 1951 which provided for district and local committees, two-thirds elected and one-third appointed by the chiefs. Following decolonisation in 1957, a system of fully elective district administration was introduced. However, first under Nkrumah's CPP administration, and then under subsequent military and civilian administrations, local government became subordinated to the needs of the central government, to the detriment of the citizenry (Amanor and Annan, 1999). Throughout the period of independence, local authorities and the stool chieftaincies have been played off against each other, by successive governments, none of which have ever had sufficient power to risk creating a genuinely representative and independent tier of representative local government. Fear of regional and/or ethnic separatism has also conditioned the response, and caused governments to hold back from any substantial shift in political authority (Haynes, 1991).

During the CPP period, the chiefs were seen as the main threat to modernisation, and town and development committees were used to counter their power. These were kept firmly under the control of the CPP-appointed district commissioners, however. With the overthrow of Nkrumah in the military coup of 1966, power shifted back to the chiefs, and the district committees declined in power. Nine Regional Councils were created, with primary development planning roles. The Busia government (1969-71), although initially critical of the centralist approaches of its predecessors, subsequently reinforced this tendency. Both Regional Chief Executives and Chairmen of the District Councils were appointed by the central government. The National Redemption Council (NRC) which took power in the coup of 1971 likewise failed to honour its commitments to devolution. Neither of the two elective levels promised in its programme of local government reform (local and regional councils, which were to be located, respectively, above and below the district level) was ever created. District Councils formed the main vehicle for local

administration, but these were relatively large (there were 65 of them, with authority over populations of between 150,000 and 240,000). Central government retained control over most development processes, and public disillusionment with local government was only reinforced. Only 18% of the electorate turned out in the 1978 district elections. (Haynes, 1991)

The 1979 uprising of junior officers began to put in place a new structure of mass mobilisation, and this was consolidated and extended when, following a brief democratic interlude, the Provisional National Defence Committee (PNDC) came to power on 31 December 1981. Following dissolution of the district councils which had been elected in 1978, the PNDC formed People's Defence Committees (PDCs) to act as vigilante organisations against corruption and profiteering. These also became involved in community development. District Secretaries were appointed in 1983, and these were responsible for nominating management committees to replace the formerly elected councillors. The PDCs were subsequently transformed into Committees for the Defence of the Revolution (CDRs), whose main functions were community development, information dissemination, education and arbitration in inter-community disputes (Ibid). The aims at this stage were to legitimize a regime sorely in need of an alternative power base, and to compensate for its impoverishment and lack of resources for development. The PNDC's pamphlet *'Decentralization in Ghana'* (1983) stated that the purposes of decentralisation were:

- To increase initiative and development at the sub-national level;
- To reduce the urban/rural divide;
- To end the drift away from the countryside. (Haynes, 1991:289)

Notably, however, the intention was only to decentralise administrative - not political - authority (Haynes, 1991; Amanor and Annan, 1999). No political roles were accorded to the local level, and the PNDC ensured that no local political opposition was permitted to emerge.

With the return to civilian rule and democratic government at national level in 1992, the District Assembly system was retained. Also retained was the prohibition on involvement of national political parties in district level elections. These were to be held on a purely local basis, with candidates standing as individuals without any party affiliations

Structure of decentralised local government

In 1987, the government announced a new programme intended to decentralise and democratise the administrative structure. Section Six of PNDC Law 207 gave both legislative and executive functions to a new institution of district assemblies, which were to replace the former PDCs.

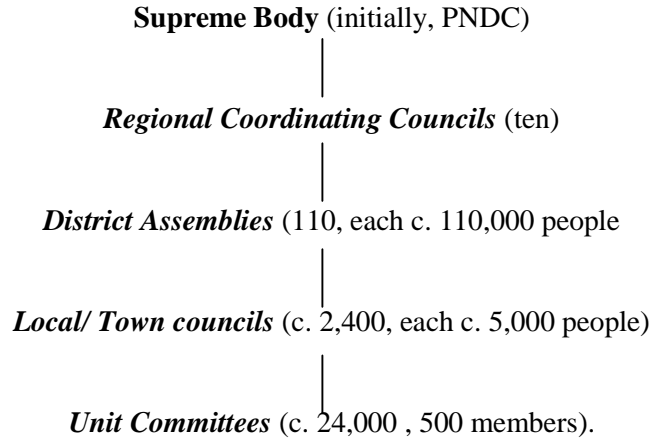
The central features of this section of the Law included (Ayee, 1996):

- An increase in the number of districts from 65 to 110 (with 107 District Assemblies and 3 major Metropolitan Assemblies);
- First-past-the-post elections to be held in late 1998/early 1999 for two-thirds elective membership, at the start of a four-year electoral cycle;
- Nomination of the remaining one-third (by the PNDC, after consulting with the traditional authorities and other district-level interest groups);
- The deconcentration of government departments to district authority;
- Creation of District Development, Planning and Budgeting Units, and District Planning and Budgeting Officers’;
- The ceding of certain revenue sources to the district assembly level, and certain other financial transfers from the central government, on a delegated basis;
- Some degree of decentralisation of contracts and tenders.

Crook and Manor characterise the Ghana model of decentralisation as of a ‘mixed’ or ‘fused’ type – ie. the district assemblies were conceived as forming part of a “single, integrated hierarchy of government administration from local to national levels.” (1998: 207) They represent an amalgam of the traditional district administration, under the authority of the central government, with a more genuinely devolved local government, with its own democratic controls, services, and tax-raising powers.

The overall structure is as follows:

STRUCTURE OF LOCAL GOVERNMENT IN GHANA, FROM 1988 (Haynes, 1991, 292)



Each District Assembly was headed by a District Secretary (later named District Chief Executive), to be appointed by the President. From 1992, a requirement of approval of any Presidential nominee by two thirds of the Assembly was also introduced. By the same token, a two thirds majority would be needed for a vote of no confidence. The DCE is assisted by a career civil servant, the District Administrative Officer (later, District Coordinating Director. However, the day to day administration of the district was - and still remains - in the hands of an elected Executive Committee, comprising not more than one-third of the total elected Assembly, which are responsible for its executive and coordinating functions. (Crook and Manor, 1998, 234)

Thus 'accountable' to the Assembly, the DCE is responsible for the supervision of the executive departments of the district, as well as the executive committee and various subcommittees. Assembly meetings are, however, presided over by an elected Presiding Member.

The District Assembly was primarily conceived as a district planning authority (Botchie, 2000, 25), to be responsible for:

- comprehensive economic, social and spatial development plans;
- integrating sector plans;
- mobilising the resources of the district and protecting its environment;
- promoting social development and productive activities;
- provision of municipal works and services and developing basic infrastructure.

The 1993 Local Government Act organised all 22 sectors, which had been devolved to the local level, into 12 departments incorporated under the unitary authority of the Assembly. (Crook and Manor, 1998, 205)

District Assemblies have a number of statutory environmental functions (particularly brown issues such as sanitation, water and pollution). There is presently no requirement for Assemblies to convene environmental sub-committees. Only five sub-committees are statutory at Assembly level. These are for Development planning, Works, Social Services, Justice and Security, and Finance and Administration (Local Government Act 462, Para 24). However, DAs are at liberty to create other specialist sub-committees, and District Environmental Sub-committees (DESCs) are among the most common.

Like the DAs, the Unit Committees comprise elected and appointed members in the ratio 2:1 (ten elected, and five appointed). The Assembly members are ex-officio members of the Unit Committees in their respective areas, and act as an important link between the two levels. (Botchie, 2000, 41) Only since 1997-8, has this lower-level structure been close to fully operational, with the holding of many of the Unit Committee elections.

Problems with implementation

This research report will examine the implementation of decentralisation in the districts of the study, with particular references to its environmental consequences. Here, we review the literature on Ghana's decentralisation in more general terms, identifying the main constraints on its implementation to date.

A number of studies exist on this theme, of which the major for our purposes are: Haynes (1991); Aryee (1996); Mohan (1996); Crook and Manor, 1998; Amanor and Annan (1999); and Botchie (2000).

Amanor and Annan identify a number of areas in which major problems have arisen, of which three merit particular mention:

- i. Problems in integrating decentralised departments into district assembly structures and decision-making processes;
- ii. Lack of skilled personnel;
- iii. Lack of a sound financial base.

i. Problems of integration:

From the start, the district assemblies have suffered from the failure of the central government to fully implement its decentralisation policies, in both their administrative and fiscal aspects. 22 departments were intended to be decentralised. Only the Forestry Department (now the Ghana Forest Service) was to retain its national status, albeit only in the southern regions, in recognition of the strategic importance of its moist forests to the economy. However, the staff of the departments which were decentralised still depend on their national ministries for budgets, salaries, promotion and conditions of service, and their loyalties were thus divided between Accra and the district. In a partial attempt to rectify this problem of divided loyalties, budgets are to be devolved to district level, and placed under the control of the Assembly. However, while the Local Government Act was passed into law in 1993, the associated Local Government Services Bill has still not been enacted. Plans for the election of all members of the District Assembly, and for the appointment of the District Chief Executives to be fully subordinated to the will of the Assembly, also remain on the drawing board.

ii. Lack of skilled personnel

A further problem which has arisen concerns the administrative capacity at the district level. While the national appointees to district-level posts (particularly the District Coordinating Officer) retain their national status, under the auspices of the Civil Service Commission, there is no equivalent national service at district level, and thus district staff are limited in their ambitions and career prospects. There have been calls for the creation of a national-level 'Local Government Service', with district cadres able to circulate in all 110 districts, but as yet, this has not materialised.

One consequence of this is an extreme shortage of qualified technical staff to serve the district assemblies. The following table summarises the situation as of 1997 as regards the primary district function (development planning) on a national basis (Botchie, 2000:37):

N ^o . of district planning officers per district	N ^o . of districts reporting	Percentage
4	2	1.8
3	2	1.8
2	41	37.3
1	48	43.6
0	17	15.5
Totals:	110	100

Source: MLGRD (HR Division) records, 1997.

The Brong-Ahafo Region is among the better endowed, as illustrated by the following figures :

Brong-Ahafo Region	N ^o . of Districts in the region	N ^o . of district planning officers per district	N ^o . of districts reporting
	13	4	1
		3	1
		2	5
		1	5
		0	2
Total N ^o . planning officers (13 districts) = 22			

By contrast, the Upper East Region, with six districts, has only two planning officers in all. Even the well-placed Central Region, with 12 districts, has only 12 planning officers, with four of its districts having no one at post at all. Consideration needs also to be given to retention of staff. For example, in 2000, the Ashanti Region lost a quarter of its planning officers (9 out of a total of about 34), mostly, it is said, to NGOs able to pay much higher salaries than the state.

Low technical capacity within the district-level civil service is compounded by low capacity within the elected assemblies. Though the local elites are disproportionately represented, elected assembly members often have relatively little formal education, and are easily intimidated by the appointees and professional staff. Local participation is therefore low, and planning has only limited relevance to local needs. (Amanor and Annan, 1999, 13)

iii. Lack of a sound financial base

Districts have five primary sources of revenue (Botchie, 2000, 31-2):

- a) *Central government transfers*, the main of which are the salaries of centrally paid DA staff, and the 'District Assembly Common Fund' (DACF). This is calculated on a revenue formula based on a combination of an agreed minimum payment to all districts, supplemented by a population factor and a development status factor relating to access to public services in the principle town, with an additional 'responsiveness' component to motivate the districts to increase their local revenue generation. The DACF is fixed, under the Constitution, as not less than 5% of total revenues of the state.
- b) *Ceded revenues*, being the total of revenues collected by the Internal Revenue Service on behalf of the DAs (as a share of taxes on income, ceded revenue comprised only 1.5% in the period 1993-5).

- c) Traditional district level revenues such as the basic rate (poll tax), property taxes, and others, to be fixed by the Assembly itself, as well as licences (alcohol sales, hawkers, etc.) and fees such as market tolls and crop levies (for exports across the district boundary).
- d) External assistance from donor agencies, including NGOs; these are mostly for development projects in areas such as health, education, water and sanitation, poverty reduction, and agriculture and micro-projects.
- e) Other locally-generated revenues, such as (where applicable) mining and timber royalties.

Expenditure of the DACF is controlled by the central government , currently being allocated as follows:

Allocation:	Percentage
'Development' (education, health, agriculture)	50
Sanitation vehicle purchase	5
Capacity building	2
Rural electrification	3
Poverty alleviation	20
Self-help projects	10
Housing	5
Disaster management	5
[all after deduction of 10% reserve]	

As this table indicates, education, health and agriculture are regarded as the 'main stakeholders' of decentralisation; these have generally been the most reluctant to decentralise. Locally-generated revenues can be dispensed as the district wishes, subject to operation of its democratic procedures.

The DACF is the major fund available to most districts. The amounts allocated to the districts vary considerably from year to year (with 2000 being a particularly difficult year), as the following table indicates:

DISTRICT ASSEMBLIES COMMON FUND**Districts Allocations (1994-2000)***(in millions of cedis, rounded to nearest '00,000)*

Region:	1994	1995	1996	1997	1998	1999	2000
Western	3,500	5,300	9,500	12,900	12,400	14,100	4,800
Central	3,700	5,700	7,600	9,100	13,000	15,000	5,000
Greater Accra	3,600	5,500	7,800	9,300	10,300	12,600	3,600
Eastern	4,900	7,400	9,600	11,300	15,600	16,800	6,000
Volta	3,700	5,600	6,900	7,800	11,400	12,600	4,300
Brong-Ahafo	3,700	5,700	7,800	9,300	12,600	13,800	4,900
Ashanti	6,400	9,800	14,100	16,600	21,700	24,300	8,300
Northern	3,300	5,000	7,300	9,000	13,000	16,300	6,000
Upper West	2,000	2,600	3,700	4,200	6,000	7,000	2,700
Upper East	1,700	2,600	3,700	4,200	5,900	7,000	2,700

Most district assemblies are seriously constrained financially. This relates to two main problems. Firstly, there is a problem of inadequate funding; the district allocations are generally insufficient to the tasks in hand, on top of which there is no guarantee that the sums in question will actually be received into the district accounts. And secondly, Assembly members are often reluctant to exploit to the full their local revenue generating powers. The problems here are largely political. Writing of their case studies in two districts (East Akim and Mamprusi) in the early 1990s, Crook and Manor see the dilemma thus:

“The principle of community-based self-help did not fit easily with the institution of representative district government, in so far as it undermined the legitimacy of district taxation and raised irreconcilable differences in the procedure for allocating very limited resources. ... elected members found it hard to justify the legitimacy of district taxation when their only argument was that the community would receive a direct return on its contribution. For most members, this implied link could never be demonstrated....” (1998,266)

Summing up Ghana's experience, Crook and Manor identify a number of problems which have to be addressed in any situation of decentralisation. Firstly, that accountability to elected officers can only work where autonomy is granted in the management of resources. Secondly, that the need to ensure effective management, and also to contain its costs, require that central government should be modest in its ambitions for decentralisation. In the Ghana case, these authors argue, the reforms are probably much too radical. This is the case both in terms of the number of sectors to be coordinated, and the numbers of assemblies created for the purpose. (1998, 269-270)

Annex 4: The Way Forward

In recent years the framework for agricultural development and natural resource management has experienced considerable change. New paradigms for development are in the process of being developed.

4.1 Changing Paradigms

The paradigms of the 1960s and 1970s of state-led modernisation through technology transfer, and dissemination via ‘trickle down’, are no longer applicable in current policy contexts. In the 1960s and 1970s the main agricultural strategies were based on development of state farms, inputs subsidies and soft loans. This approach supported the development of mechanised agriculture by richer farmers, and agricultural extension and delivery systems which promoted new technologies. During the 1970s agricultural modernisation entered into crisis, and support for the agricultural sector drained state resources and subsidies. These policies also had negative impacts on the environment, and encouraged dependence on state resources rather than a dynamic agricultural sector.

By the 1980s the agricultural modernisation project crumbled. The state could no longer financially support subsidies, and structural adjustment policies required divestiture of state enterprises, and an end to state intervention. Agricultural development paradigms based on transfer of technology gave way to participatory technology development, and decentralisation became a key to administrative reform. The new agenda emphasised poverty alleviation, natural resources management and sustainable development. The central concerns were with development processes that were inclusive, promoted equity and gender participation, and considered a variety of livelihood options.

Within the changing context of agricultural research and development, new approaches and new institutional innovations need now to be created. The major concern is to move beyond the extension of influence of a state sector or policy sector, through the distribution of new technologies and building up of a clientele of faithful supporters, to considerations of the improved quality of communication and dissemination of

information at all nodes of production and in multiple directions. New approaches are required that improve decision-making in natural resource management from local level producers to national level administrators. This requires new institutional innovations which promote feedback on the environment and production systems from various localities as well as information systems which regularly update themselves and which policy makers can use to learn about the conditions which people experience in their daily life.

These information systems should facilitate debate at various policy levels to foster more informed and appropriate policy options. The interface between administrative organs and perceptions of different people within the localities, and the learning processes that emerge from the interface at both these levels is what will ultimately determine if a sustainable development process can be implemented. Policy makers need to make policies which are informed by the experiences of citizens, and citizens need to understand the avenues through which they can create demands for appropriate policies.

Given the complexity of social arrangements, micro-environments and change, sustainable production systems cannot be conjured up in experimental stations and transformed to the localities as technological prescriptions. Neither can improved ecological management be implanted by the decrees of policy-makers who claim to understand all the environmental processes and problems. The premise for a better policy process is the setting up new information systems which are inclusive and involve a consultative process with a wide range of interest groups within the rural areas, and which bind policy-makers to downward accountability. These information systems need to collect empirical data on the different interest and livelihood groups within the various localities, the natural resource base and the economic potential of the various localities. They also need to reflect the perceptions and interests of the various groups within the localities.

4.1.1 Institutional mechanisms

The process of decentralisation within Ghana has suffered from numerous constraints and setbacks. It may have fallen short in achieving its aims and objectives. Nevertheless, it remains the only avenue through which rural dwellers come into contact with development administration and have any say in development planning.

While local-planning processes within decentralisation may be wanting, the shortcomings are not necessarily the product of decentralisation. They could as easily be blamed on bureaucratic culture in Ghana. The legal framework for decentralisation provides ample scope for accountability, for civil society participation in development planning, and for communities to develop their own development plans. The contradictions often come from the higher echelons of administration, from ministries, departments and regional co-ordinating bodies who issue top-down directives and expect the districts to comply; from government agencies who expect districts to implement government policy without a debate on the appropriate needs of the districts; from departments who think they are too important to decentralise.

The legal framework for decentralisation requires district departments to collaborate in developing district sector plans which are ratified by an Assembly with a majority of members. Unit Committees and Area Councils with an elected majority then initiate development plans which have been discussed with the communities. Strengthening these linkages has the potential of building upon civil society participation making district assemblies more accountable to a rural electorate.

4.2 Other interventions

Several donor projects now focus on strengthening the district planning process, attempting to enhance planning procedures by facilitating more inclusive consultation, more transparent procedures governing allocation of resources, an improved responsiveness to civil society groups. They include the following:

1. The *CIDA Community Governance Project* operates in the Upper West, Upper East and Northern Regions. Its objective has been to build capacities for

- decentralised planning in six pilot districts. It has provided training in development and financial planning to the Six District Assemblies and implemented demonstration infrastructure programmes for the assemblies to manage.
2. The *DANIDA Support to District Assemblies* operates in the Upper West and Volta Regions. The programme focuses on the health sectors in districts in these regions and seeks to provide support for strengthening administration and management at the district level to foster a more participatory and accountable development. It has largely been concerned with building information systems on the districts and enhanced planning procedures.
 3. The *DFID Support for District Assemblies* operates in the Brong Ahafo Region. The programme is situated within the agricultural sector offices, but is concerned with improving the cross-sector linkages within the district administration, and linkages between these sectors and the district assembly to produce a more integrated and effective planning system which is more responsive to the needs of the rural population. The programme focuses on the linkages within the district administration and not the linkages between the district assembly and civil society. It does not work with Unit Committees. Its ultimate success will thus depend upon other projects facilitating linkages between the district administration and civil society, creating demands from the various localities on district services and the district planning process.
 4. The *GTZ Programme for Rural Action* focuses on village communities in three select districts in the West Gonja, Kintampo, and Hohoe districts. It operates at two levels. It seeks to improve planning procedures within the districts and promote a participatory planning process that involves local communities in articulating their development needs the district level. It works with the Unit Committees within villages, training Unit Committee members in using community animation techniques - which are essentially drawn from Participatory Rural Appraisal (PRA). These PRA techniques are used to discuss problems and potential solutions at community meetings and develop a set of prioritised and ranked projects from which the Unit Committee can develop project proposals to

be submitted to the district assembly for funding. At the district administration level the programme works to establish a set of transparent procedures and criteria, through which projects submitted by Unit Committees are screened, vetted and selected for funding. The aim of the process is to create a demand-driven participatory planning process with accountability and transparency that responds to local level needs, and ensures that district funds are not used for political objectives or rent-seeking.

While the GTZ Programme for Rural Action is the most comprehensive in building linkages and accountability between rural dwellers and policy makers, its reliance on PRA techniques is oriented to the support of the community infrastructure programmes on which it focuses. This approach may have serious constraints when applied to natural resource management. Here, different interest groups exist that are frequently locked in conflict and competition, and the local community is likely to be socially highly differentiated. In this situation, attempts to develop a rapid analysis, to gain a consensus that prioritises plans of action, to foreclose debate, disagreements and negotiation may all have negative outcomes. Minorities, women and other less powerful groups in the community may be inhibited from attending the forum, from expressing their interests and points of view, and the consensus of the community becomes that of the politically dominant group or that group with the closest links to dominant political and policy interests. Those groups with insecure access to natural resources and lack of access to information, knowledge and technology, are most likely to be disadvantaged at a community forum. Those with most access to natural resources, information, knowledge, government services and technology are going to be the most confident and able to dominate the forum. Without *a priori* research which can identify social processes and their implications for development initiatives, the social representation of a community forum remains unknown.

With the advent of PRA as a research tool researchers have tended to focus on developing more flexible and process oriented modes of planning in which participatory planning is organised as a research tool. The researcher's main role is that of facilitation:

to bring the expertise of knowing how to facilitate a process of negotiation and identification of problems and solutions to the process. The implication is that people cannot act in a rational communicative way without someone capable of facilitating the process (Leewis, 2000). However, as Leewis argues, scarcity or conflict over resources may in reality prevent people from taking part in a communicative platform process. Any attempt to bring closure to these conflicts may marginalise particular groups and enable those interests who have been able to persuade the policy-maker/researcher that they represent the authentic voice of the community (or that they are the most congenial inhabitants) to establish ascendancy.

The justification for using PRA techniques has in the past been the need for rapid analysis, as well as a critique of the slowness of conducting surveys. However, the technology available to researchers today opens up avenues for rapid processing of survey methods. The proviso is that the traditional hierarchical relations within a research team (field interviewers, data in-putters, statistical analysts, and report writers) are transformed. In carrying out such research, a variety of techniques is used including informal discussions, more formal group discussions and individual survey questionnaires.

In the present instance, for example, while the informal and groups discussions were instrumental in identifying issues, the questionnaire survey revealed many surprising findings. When these were fed back to groups within the community, these findings were often confirmed, elaborated upon or provoked intense debate in which different positions emerged. This process not only enlightened our research process but also provided communities with knowledge which they could reflect upon and information on which they could elaborate their perspectives.

For instance, the finding in the survey that more farmers were growing maize at Mansie was surprising to the research team. When fed back to groups of farmers at Subinso, it was confirmed, but prompted them to make an analysis of the different conditions of production at Mansie and Subinso, the problems that had emerged from the use of inputs

and tractor ploughing, the responses of farmers at Subinso to these problems. It also facilitated a debate and reflection of how Subinso was linked into the wider agricultural economy and policy environment. It should be possible to build upon these processes to create information for the further development of research and for the benefit of farmers to build their bridging ties and linkages to wider policy processes.

4.3 Entry points for community action

A potential alternative entry point into a community is to act as a provider of information. On this approach, the first objective of collecting and disseminating information would be to gain a better understanding of the social groups within the communities, their livelihoods, their policy perspectives and their interests. A second objective would be to provide information to these groups to facilitate the development of bridging ties through which they can articulate broader group interests. A third objective would be to provide them with information which would facilitate their ability to develop strategic linkages with other groups and place their demands to policy-makers. A fourth objective would be to examine the potential of local level participation in research processes, to generate their own research, to process their own data and information, and to be able to update information systems and utilise them for placing their demands in the policy process.

This entry point creates a different role for the researcher than that of the PRA process. The researcher no longer plays the role of the facilitator of a rational process of negotiation which seeks to bind the whole community to a community plan of action. The role of the researcher is rather to provide information and facilitate information generating processes to facilitate policy processes, feedback and accountability. The outputs of research become information systems that facilitate communications between policy processes and natural resource users.

At present information systems within the districts are weak. There are no institutionalised processes for generating a knowledge base on the needs of localities and the different interest groups that reside in them. As a result of these constraints it become difficult for district administrations to develop district profiles, and for Assembly

Members and Unit Committees to present their needs beyond the parochial concerns of their individual village. Without the ability to draw up a district profile, the districts are unable to place their needs and demands before higher-up administrative organs. They become subservient to top-down national prescriptions imposed by Regional Coordinating Councils, which are frequently based on minimal and fragmentary national-level data substantiating a framework that is essentially built on received wisdom of external origin.

To develop policy processes that are more inclusive and respond to the needs of rural dwellers, district level information systems need to be created. The information so derived needs to be able to be processed and updated in ways which enable the concerns of various localities to be reflected in planning procedures. This requires the two-way communication of information between localities and their Unit Committees and the district administration.

Unit Committees and Area Councils should be able to collate basic information on their settlements, the characteristics of the population in the settlement, the different livelihood groups within their settlements, the policy interests of different groups, the natural resource base and natural resource conflicts, the incidences of bush fires, etc. They should be able to feed this information to district assemblies and also request information on trends within the districts. This information should also be available to the District Assembly members and the sub-committees and should inform their deliberations. It should go into the formulation of a district profile which informs the planning process and is also conveyed to regional coordinating councils. These information systems need to be built from the community level upwards to achieve responsiveness to changing conditions and the interests of people. This would be in marked contrast to the technocratic information systems which are built by sector organisations which tend to identify optimal land planning production systems based on the inherent physical characteristics of regions rather than the economic activities of their inhabitants.

4.4 The Proposed Programme

The major task of the programme will be to identify the interest groups at different points in the hierarchy of the system of decentralisation, from the localities with their Unit Committees through the District administration to the Regional level. Research would identify their information needs, and the major constraints which limit their ability to collect, process and communicate information. It would also strengthen and facilitate their information-generating and communicating processes, and utilise the research capacities of the research team to generate information which these levels can also utilise. This would include access to findings of research services, national databases, remote sensing information, geographical information systems, etc.

Natural resource issues, however, are not constrained by the settlements in which people live. The economic activities of different producers are integrated into a regional economy, in which the activities of a wide range of producers define the niche which one particular set of producers can occupy. Many of the problems in natural resources management in particular areas also occur over a wider area, with variations in the processes of adaptation, conflicts, negotiation of conflicts, and institutional innovations.

Thus, one means of giving natural resource users greater access to information would be to develop regional networks which would bring farmers together to examine particular problems in natural resource management, different perspectives on the problem and different approaches to the resolution of the programme. This could include situations involving conflicts between different natural resource users that are replicated in a number of localities, such as between charcoal burners and (yam) farmers, where reflections on the different histories of conflict and negotiation, could promote social learning. It could also involve situations in which different natural resource users have worked out a set of different adaptive responses to similar problems, or where the adaptive response in one area has consequences for other natural resource users in other areas.

This programme could involve a series of farmer and other resource users exchange visits; workshops which seek to draw lessons from various experiences; and visits to research organisations and government services to exchange experiences. The objective of this network would be to bridge experiences between natural resource users, to enable them to address problems requiring collective actions and to enable them to draw up a framework of reference that enables them to engage in dialogue with policy makers. One output of this programme would be to facilitate workshops between policy makers and rural producers in which the networks of natural resource users could place their demands and projects to the policy makers. The types of themes to be addressed (which would need to be identified by participating networks of farmers) could include issues such as the following:

- Yam, charcoal and tree regeneration: Is there a problem? What are the solutions to good relations between charcoal burners and farmers?
- Maize production with inputs and with bush fallowing, and management of the soil.
- Changes in yam producing technologies.
- Bush fire management: The farmers' perspectives in different areas.
- Vegetable production technologies and stream conservation
- Implications of intensification for women's access to land and farming strategies

This could culminate in a 'week of action' in a District which would attempt to raise the profile of natural resource users in the rural areas.

In terms of resource foci, the Project should cover:

- The management of natural resources control of which has been largely or entirely devolved to the district level (e.g. agricultural products, of the types discussed above, and farm-based products such as charcoal)
- The management of resources which have not been decentralised to the local level, but which impinge directly upon it, and have major implications for the ability of local resource users to sustain and develop their livelihoods.

To cover the second of these topics, it is proposed to include tree plantation development in the substantive phase of the Project.

The Brong Ahafo is likely to be the focus of a major externally funded plantations programme in the coming years. This is not uncontroversial. On the evidence to date, the programme may well favour exactly the sorts of entrepreneurial approaches to resource capture and land development which have already blighted post-independence agricultural modernization in the region, largely to the detriment of the small producer. Information and institutions are again the key. If the small farmer community is to derive benefit from the scheme, it is essential that its members – and their elected representatives – are well informed about it, and are able to influence its implementation. Developing an effective interface between local producers, elected representatives (Unit Committees and District Assemblies), and officials of the devolved and non-devolved public services (agriculture and forestry) is essential to both these tasks.

4.4.1 Project Outputs

In summary, the project outputs will focus on improvements in three areas of intervention:

1. *The quality of information* available at district level
2. *Networking* between farmers
3. *Articulation of the needs and problems* of rural producers with the democratic organs of local and regional government.

The project outputs are as indicated in the draft Phase Two Logframe, which is presented in the following section (Annex 5).

References

- Adjei Sakyi, D. (1997) A Survey of the Charcoal Industry in the Kintampo District ,
University of Science and Technology, Kumasi, Institute of Natural Resources
Department of Silviculture and Forest Management.
- Amanor, K.S. (1993) Wenchi Farmer Training Project: Social/Environmental Baseline
Study, Wenchi Farming Systems and Training Project, Farm Institute, Wenchi.
- Amanor, K., Denkabe, A., Wellard, K. (1993) "Ghana: Country overview", in K. Wellard
& J. Copestake (eds.) *Non-Governmental Organizations and the State in Africa:
Rethinking roles in sustainable agricultural development*, Routledge: London.
- Amanor, K. and Annan, J. (1999) 'Linkages between Decentralisation and Decentralised
Cooperation', ECDPM Discussion Paper No.9, Maastricht.
- Amanor, K. with Kude Dideretuah, M. (2001) Share Contracts in the Oil Palm and Citrus
Belt of Ghana, London: IIED.
- Andah, B.W. (1993) "Identifying early traditions of west Africa" in T. Shaw, P.
Sinclair, B. Andah, A. Okpoko (eds.) *The Archaeology of Africa: Food, metals
and towns*, London:Routledge: 240-253.
- Asare, A. (2000) Operational Guidelines on Community Forest (Management)
Committees, ITTO/FSD Collaborative Off-reserve Forest Management Project,
Forest Management Support Centre, Kumasi.
- Ayee, J.R.A. (1996) The Measurement of Decentralization; The Ghanaian Experience,
1988-92, *African Affairs*, Vol.95: 31-50.
- Basset, T.J. and Boutrais, J. (2000) "Cattle and Trees in the West African Savanna" in R.
Cline-Cole and C. Madge, C. (eds) *Contesting Forestry in West Africa*, Aldershot:
Ashgate: 242-263.
- Botchie, G. (2000) Rural District Planning in Ghana: A Case Study', Environmental
Planning Issues No. 21, IIED/ISSER/DFID.
- Crook, R. C. and Manor, J. (1998) *Democracy and Decentralisation in South Asia and
West Africa*, Cambridge University Press.

- Coursey, D.H. (1976) "The Origins and Domestication of Yams in Africa" in J.R. Harlan, J.M.J. de Wet, A.B.L. Stemler (eds.) *Origins of African Plant Domestication*, Mouton: The Hague.
- Crooks, R.C. and Manor, J. (1998) *Democracy and Decentralisation in South East Asia and West Africa*, Cambridge: Cambridge University Press.
- Fairhead, J. and Leach, M. (1998) *Reframing Deforestation: Global analysis and local realities: Studies in West Africa*, London and New York: Routledge.
- Ghana Statistical Service (2000) *2000 Population and Housing Census: Provisional results*, Accra: Ghana Statistical Services.
- Guyer, J. (1997) *An African Niche Economy*, Edinburgh: Edinburgh University Press.
- Haynes, J. (1991) "PNDC and Political Decentralization in Ghana, 1981-91" in *The Journal of Commonwealth and Comparative Politics*, Vol. 29(3): 283-307.
- Jongkind, C.C.H. (1996) Field Report to Identify Tree Species Used for Charcoal Production, Wenchi, Wench Farming Systems Development and Training Project, Wenchi Farm Institute, Wenchi.
- Kellman, M.C. (1969) "Some Environmental Components of Shifting Cultivation in Upland Minandao", *Journal of Tropical Agriculture*, Vol. 40: 40-56.
- Leach, M., Mearns, R., (eds). (1996) *The Lie of the Land: Challenging received wisdom on the African Environment*, Oxford: James Curry and Portsmouth, N.H.:Heinemann.
- Maley, J. (1993) The climatic and vegetational history of the equatorial regions of Africa during the Upper Quaternary" in T. Shaw, P. Sinclair, B. Andah, A. Okpoko (eds.) *The Archaeology of Africa: Food, metals and towns*, London:Routledge: 43-52.
- Maley, J. (1996) The African rain forest: main characteristics of change in vegetation and climate from the upper Cretaceous to the Quaternary" in proceedings of the Royal Society of Edinburgh Biological Science Vol. 104B: 31-73.
- Maley, J. (2002) A Catastrophic Destruction of African Forests about 2,500 years Ago Still Exerts a Major Influence on Present Vegetation Formations" in M. Leach, J. Fairhead and K. Amanor *Science and Policy Process: Perspectives from the Forest IDS Bulletin* Vol. 33(1): 13-30

- Mohan, G. (1996) 'Neoliberalism and decentralised development planning in Ghana', *Third World Political Review*, 18 (4): 433-454.
- Nicholson, S.E. (1981) "The historical climatology of Africa" pp. 249-270 in M.J. Ingram, D.J. Underhill, G. Farmer (eds.) *Climate and History: Studies in past climates and their impact on Man*, Cambridge: Cambridge University Press.
- Nye, P.H. & Greenland, D.J. (1960) *The Soil under Shifting Cultivation*, Commonwealth Bureau of Soils Technical Communications 52, Farnham Royal: Commonwealth Agricultural Bureau.
- Plan Consult (1993) *Roots and Tubers: A report by the commodity committee of National Agricultural Research project. Appendix VI vol.4.* Plan Consult, Accra.
- Pursglove, J.W. (1978) *Tropical Crops: Monocotyledons*, Longmans: London.
- Stahl, A.B. (1993) "Intensification in the west African Late Stone Age: A view from Central Ghana" in T. Shaw, P. Sinclair, B. Andah, A. Okpoko (eds) *The Archaeology of Africa: Food, metals and towns*, London: Routledge: 261-273.
- Tripp, R. (1993) "Invisible Hands, Indigenous knowledge and inevitable fads: Challenges to public sector agricultural research in Ghana", *World Development*. 21(12): 2003-2016.
- Van Rompaey, R. (2002) New Perspectives on Tropical Forest Vegetation Ecology in West Africa: Typology, gradients and disturbance regime in M. Leach, J. Fairhead and K. Amanor *Science and Policy Process: Perspectives from the Forest IDS Bulletin* Vol. 33(1): 31-38.
- Wilks, I.G. (1977) "Land, Labour, Capital and the Forest Kingdom of Asante: A model of early change", in J. Freeman and J. Rowlands (eds) *The Evolution of Social Systems*, London: Duckworth: 487-534.
- Zang, P. van der, Fox, R.C., Kwakye, P.K., Obigbensen, G.O. (1980) "The Phosphorous Requirements of Yams, *Dioscorea spp.* " *Tropical Agriculture*, 57(2): 97-106.